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THESIS

THE
ECONOMIC SIGNIFICANCE
OF THE
AUTOMOBILE

BY
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INTRODUCTION

Of all the industries in the United States today, the automobile industry is by far the most important. This comparatively new industry challenges our attention because of the enormous amount of capital, labor, and natural resources which it involves.

While there is a tremendous interest in automobiles from a social standpoint, the economic facts are rarely presented, and when presented, they consist of only the sensational facts. To learn fully our indebtedness to the inventor of the motor car it is necessary to delve into government publications, technical documents, and business publications.

It is surprising that our universities have not established courses dealing with the economic effects of the automobile. Some courses are offered which consider incidentally the effect of the automobile on certain phases of American life, but courses on its economic aspects exclusively are not offered. Yet such courses are offered relating to the railroads and to the public utilities.

It is the purpose of this thesis to prove by the presentation of economic information in which statistics play a major part that our American prosperity has been due, in a large measure, to the invention of the automobile.

CHAPTER I

A SHORT HISTORY OF THE AUTOMOBILE

In all books written about the history of the automobile, there is a unanimity of opinion in awarding to Nicholas Joseph Cugnot, a Frenchman, the title, "Inventor of the Automobile". While others had experimented, he was the first person to produce a machine that would move by its own power. It was, actually, "a horseless carriage".

Cugnot's machine was a heavy tricycle with the boiler and engine mounted over the front wheel. Because all the machinery rested on the front wheel the steering was difficult.¹ This he invented in Paris in 1769² for the purpose of moving the heavy French cannon. The first car is now on exhibition in the Conservatory of Arts and Trades in Paris.³

During the years 1861-65, another Frenchman, Lenoir, became interested in gas engines. His experiments were very useful to later inventors.

The French were pioneers in the industry. We learn that by midsummer, 1894, there were fifteen cars in France of sufficient endurance to race seventy-five miles from Paris to Rouen.⁴

1. Simonds, Henry Ford, Motor Genius, p. 42
2. Gibson, The Motor-car and its Story, p.20
3. Barber, Story of the Automobile, p. 50
4. Ibid, p. 59



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Cugnot's machine was a heavy artillery with the boiler and engine mounted over the front wheel. Because all his machinery rested on the front wheel the steering was difficult. This he improved in 1769 in 1780 for the purpose of moving the heavy French cannon. The first car is now on exhibition in the Conservatory of Arts and Trades in Paris. During the years 1881-82, another Frenchman, Javelin, became interested in gas engines. His experiments were very useful to later inventors.

The French were pioneers in the industry. We learn that by misadventure, 1884, there were fifteen cars in France of sufficient endurance to take seventy-five miles from Paris to Rouen.⁴

1. Simonds, Henry Ford, Motor Genius, p. 42
2. Gibson, The Motor-car and its Story, p. 20
3. Barber, Story of the Automobile, p. 20
4. Ibid, p. 22

The influence of the French in the early history of this industry is apparent in the amount of automobile terminology which is derived from the French. Some of these words are as follows: automobile, chauffeur, garage, chassis, and tonneau.

The French were later surpassed in the manufacture of automobiles by the Americans. Our recent news dispatches tell of a sixty per cent. tariff added by the French to their already high tariff on American cars.

In England as early as 1823 William Henry James patented a "road locomotive".⁵

The invention of the English motor-car was bitterly opposed by the people. Law after law was passed regulating the operation of automobiles until finally in 1861 due to the prevailing laws which regulated the speed to four miles an hour and which required a man with a red flag to precede the machine to give a warning of its approach there were no cars on the road.⁶

About 1861, in Germany, an engineer, named Otto, experimented with a gas engine which allowed time for the gas to be compressed in the cylinder head before the explosion took place. This product of Otto's inventive genius was improved by one of his men, Daimler, but the automobile industry was not des-

5. Bent, Machine Made Man, p. 174

6. Simonds, Henry Ford, Motor Genius, p.42

tined to begin at this time.

The first internal combustion motor-car in Germany was built by Carl Benz in 1885.⁷

In 1787, Maryland, in the United States, granted a patent to Oliver Evans,⁸ who built a steam-driven automobile which he drove through Market Street in Philadelphia.⁹

Very little is known about further inventions in this country until 1879, when George Baldwin Selden took out an American patent which caused considerable trouble later.

The year of 1893 was an eventful one in American automobile history because Elwood Haynes built a gasoline car¹⁰ which earned for him the honor of being the first American inventor of the gasoline motor-car. This car is now in the Smithsonian Institute in Washington.

Haynes was not the only producer in 1893. Others were as follows: Charles E. Duryea of Springfield, Massachusetts;¹¹ Henry Ford, Detroit, Michigan;¹² Ransom E. Olds, Lansing, Michigan.¹¹ Ford's car made a speed of twenty miles an hour while the French car two years later (1895) made only fifteen miles.

In 1893 interest in the industry was aroused. From

7. Bent, Machine Made Man, p. 174

8. McManus-Beasley, Men, Money and Motors, p. i

9. Bent, Machine Made Man, p. 174

10. Simonds, Henry Ford, Motor Genius, p. 58

11. Ibid, p. 58

12. Gibson, The Motor-car and its Story, p. 78

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7. Benz, Machine Made Man, p. 174.

8. Selden-Patent, New York and Boston, p. 1.

9. Benz, Machine Made Man, p. 174.

10. Selden, Henry Ford, Motor Vehicle, p. 38.

11. Ibid., p. 38.

12. Olds, The Motor-Car and Its Story, p. 73.

that year a slow growth was maintained but since the first cars were crude objects, erratic in performance, dangerous because of expected collisions and explosions, and disagreeable because of the smell of escaping gas fumes the public looked upon them with disfavor.

Yet in the face of almost universal opposition, the industry grew steadily. Simonds tells us that in 1898, "Twenty-five firms were building cars - steam, electric or gasoline propelled. About two hundred dealers were selling them, and in the whole country about twelve hundred were in use."¹³

Boston, Massachusetts, showed its opposition to the early automobile by refusing to allow any in the parks except before ten o'clock in the morning and after nine o'clock in the evening. This ordinance was passed because so many horses frightened by the new invention ran away.¹⁴

"The first automobile show was held in a horse stable in New York, in January 1901."¹⁵

The condition of the industry in 1901-02 is completely told in the following paragraph: "In 1901 there were 60 builders of steam cars and 41 of electric propulsion. In 1902 there were 106 steam operation, 99 gas builders and 40 electric manufacturers."¹⁶

13. Simonds, Henry Ford, Motor Genius, p. 64

14. Simonds, Henry Ford, Motor Genius, p. 65

15. McManus-Beasley, Men, Money and Motors, p. 3

16. Ibid, p. 6

From these figures it is seen that gasoline car manufacture received its start in 1902.

Interest in the automobile at this time is indicated by the fact that when President Roosevelt rode in an automobile at Hartford, Connecticut, in 1902, this event was carried on the first page of every newspaper.¹⁷ To Roosevelt belongs the distinction of being the first President to ride in an automobile.

The automobile during all this time was manufactured not as a commercial benefit but as a luxury of the wealthy Americans. In the early days of the industry the price was so high that only the wealthy could afford these cars.

The growth of the automobile industry has never been more clearly told than by two pictures which appeared in the Silver Anniversary Issue of the Automobile Trade Journal.¹⁸ In the first picture, Fifth Avenue, N. Y. is shown on Easter Sunday, 1900. There is one motor in a street crowded with people and horse-drawn vehicles. The other picture shows the same street on Easter Sunday in 1924. Not one horse-drawn vehicle can be seen.

17. Ibid, p. 11

18. P. 29, December 1, 1924

CHAPTER II

THE PRESENT STATUS OF THE AUTOMOBILE INDUSTRY

Statistics do not make interesting reading, but to one who is studying this industry they are essential. In no other way can we so clearly indicate the tremendous strides with which this industry has advanced.

In 1929, there was published the report of the President's Committee on "Recent Economic Changes in the United States". In this two-volume publication to which we shall refer several times there are some very interesting data about the automobile.

The statement has often been made that our recent prosperity is dependent, to a great degree, upon the automobile industry. The following table from the above-mentioned report supports such a claim. The table was compiled for the purpose of showing the increase in productivity in major industries. The figures given are index numbers computed on a 1914 base:

Industries in first class (above 50% increase)¹

Automobiles	210
Rubber tires	211
Petroleum refining	77
Cement manufacture	58
Blast furnaces	54
Steel works and rolling mills	60

1. President's Committee, Recent Economic Changes, Vol. 1,
p. 147

Industries in second class:

Flour milling	39
Slaughtering and meat packing	27
Leather tanning	28
Cane sugar refining	27
Paper and wood pulp	26
Boots and shoes	17

From the preceding list it can easily be seen that every industry in the first classification is related to the manufacture of automobiles or to an industry which is vitally affected by the automobile.

While the table was not compiled primarily to prove that the automobile industry and American prosperity are closely related, the facts indicate this idea very strongly.

The registration of automobiles in the United States amounts to 76.8 per cent. of the world registration. This percentage is based on the following figures which were recently issued by the Department of Commerce.² The compilation was completed, December 31, 1929.

TOTAL WORLD REGISTRATION, JANUARY 1, 1929 (Revised)

Passenger cars	27,011,602
Busses	313,903
Trucks	4,709,067
Total automobiles	32,034,572
Motor Cycles	2,264,298

UNITED STATES REGISTRATION

Passenger cars	21,423,597
Busses	92,325
Trucks	3,113,999
Total automobiles	24,629,921
Motor Cycles	121,656

2. Department of Commerce, Automotive Department - Auto 1127
January 3, 1930

Although the figures for the year ending December 31, 1929, are not published by the Department of Commerce, a recent article gives unofficial figures indicating world registration in 1929 will be 35,000,000 and the United States registration will be 26,634,210, an increase of more than 8 per cent. over 1928.³

Figures giving the world production of automobiles in 1928 were compiled by the Department of Commerce. These are the latest official figures on production.

WORLD PRODUCTION IN 1928.⁴

United States	4,358,759
Canada	242,382
Total of the U. S. and Canada	4,601,141
Austria	9,410
Belgium	7,000
Czechoslovakia	13,150
Denmark	165
England	211,877
France	210,000
Germany	89,950
Hungary	460
Italy	55,010
Japan	470
Poland	320
Russia	799
Spain	325
Sweden	1,362
Switzerland	1,700
Grand Total	5,203,139

From these figures we find that approximately 84 per cent. of the world's production in 1928 was supplied by the United States.

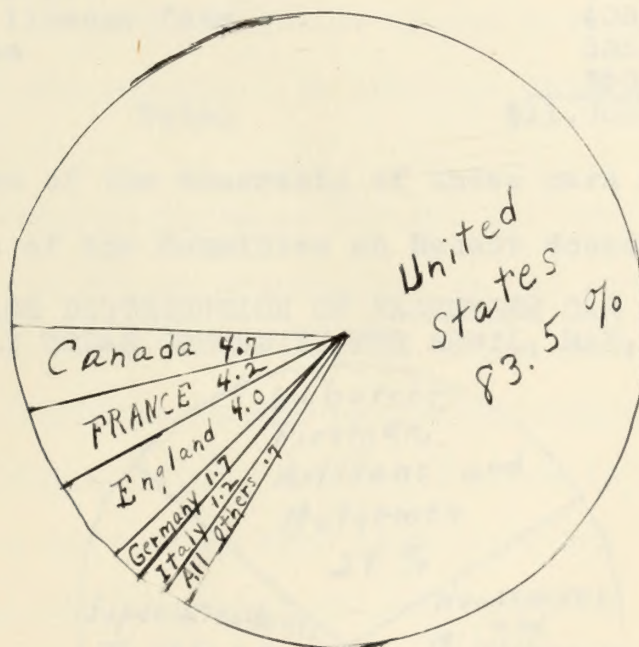
3. Automotive Trade Journal and Motor Age, March 1, 1930, p. 61

4. Department of Commerce, "1928 World Production, Export and Consumption of Automobiles" - Special Pamphlet

A striking feature of the report is Japan's output, 470. The report adds that of the 470 most of these were trucks.

That the United States does contribute 84 per cent. of the world's production of automobiles is not the unusual condition of a single year, but is on the contrary the customary one, is proven by the following graph which covers a period of five years. These figures were compiled by the National Automobile Chamber of Commerce.⁵

WORLD PRODUCTION OF MOTOR VEHICLES - 1924 - 1928



5. National Automobile Chamber of Commerce, Facts and Figures of the Automobile Industry, 1929 issue, p. 19

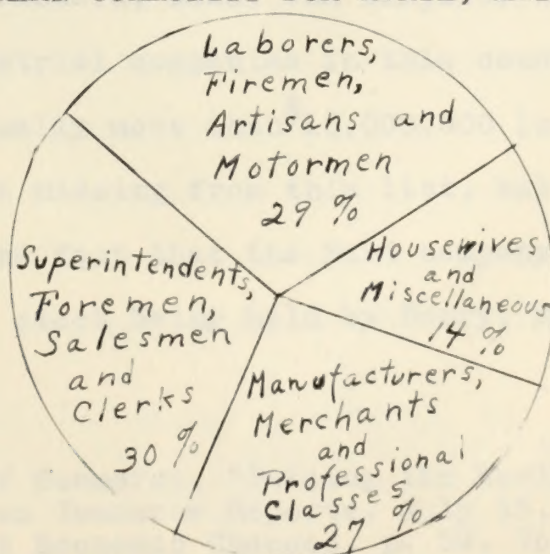
The capital invested in the industry in 1928 was \$1,965,310,508.⁶ This figure does not include investment in bodies and parts. The earnings on this capital amounted to 24.07 per cent., a very profitable investment.

Moody has computed the 1929 automobile expenditures of the American people.

<u>ITEM</u>	<u>EXPENDITURES</u> ⁷
New cars and trucks, at retail	\$3,175,000,000
Gasoline and lubricants	2,175,000,000
Repair labor and garage services	1,500,000,000
Tire replacements	810,000,000
Repair parts and supplies	735,000,000
Road repairs, interest, etc.	600,000,000
Pay to 300,000 chauffeurs	555,000,000
Storage charges	495,000,000
Taxes and license fees	400,000,000
Accessories	305,000,000
Insurance	250,000,000
Total	<u>\$11,000,000,000</u>

Some idea of the ownership of these cars may be had from a compilation of the Committee on Recent Economic Changes.⁸

PERCENTAGE DISTRIBUTION OF PASSENGER CAR SALES IN A PRIMARILY URBAN COMMUNITY FOR APRIL, MAY, AND JUNE 1928.



6. Moody's Industrials 1929, p. xxvi

7. Ibid, p. xxvii

8. President's Committee, Recent Economic Changes, Vol. 1, p. 62

From this graph we note that there is an even distribution among all classes of our population. At first glance we are surprised that the class of manufacturers, merchants, and professional men owns only 27 per cent. of the total. But this can be explained by the fact that this group is a small one, numerically, and that the individual ownership of cars in this group is probably higher than in any other group.

The world ratio of people to the automobile was estimated at 61 to 1, on January 1, 1929. Outside of the United States, the ratio was 1 automobile to 247 persons.⁹

From another source, the Committee on Recent Economic Changes, we find that the United States ratio is one automobile to every six people. In 1910 the ratio was 1 to 265 people.¹⁰

This tremendous increase has brought prosperity to many but to manufacturers of automobiles it has been most generous. General Motors, Packard, Nash, and Chrysler were among the thirty-nine industrial companies in this country which distributed individually more than \$10,000,000 in dividends in 1929.¹¹ Ford is missing from this list, but that is due, presumably, to the fact that the Ford company is a closed corporation, the stock being held by Henry, Edsel, and Mrs. Ford.

9. Department of Commerce, "Putting the World on Wheels", p. 5

Reprint from Commerce Reports, July 15, 22, and 29, 1929

10. P. C., Recent Economic Changes, p. 59, Vol. 1

11. Automotive Trade Journal, March 1, 1930, p. 62

During the year, 1929, factory sales of automobiles amounted to 5,358,361. These are Department of Commerce figures reprinted in "Nation's Business".¹² The high month was April with 621,910 units and the low month was December with 119,956.

In 1929 the state governments collected through registration fees \$346,988,859. The revenue from gasoline taxes exceeded this amount. Taxes on automobile fuel were \$407,386,816.¹³

In the tremendous growth of the automobile one remarkable accomplishment deserves notice. In the great growth in production the number of employees has decreased. In 1928 there were 4,341,138 employed in the industry, directly and indirectly.¹⁴ In 1929, it was estimated that there was 4,300,000 employed.

This decrease, notwithstanding an increased output, is made possible by the increased use of machinery to supplant the workers. This condition adds to our already serious problem of technological unemployment.

An excellent illustration of this steady decrease over a period of years follows. It was taken from the work, "Recent Economic Changes in the United States".¹⁵

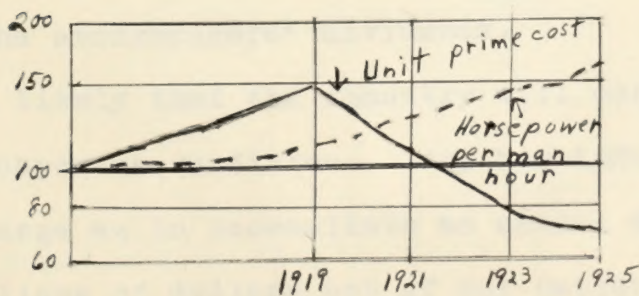
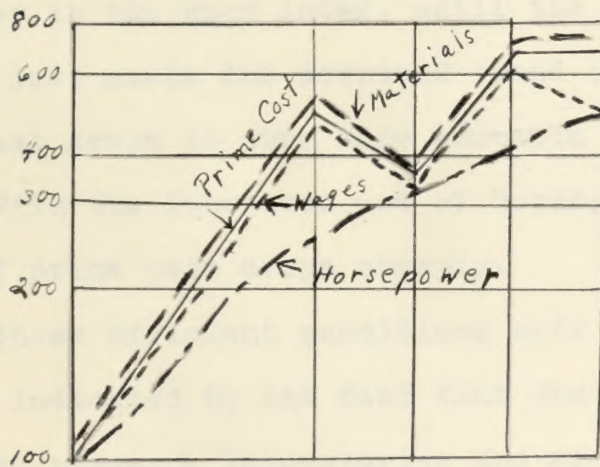
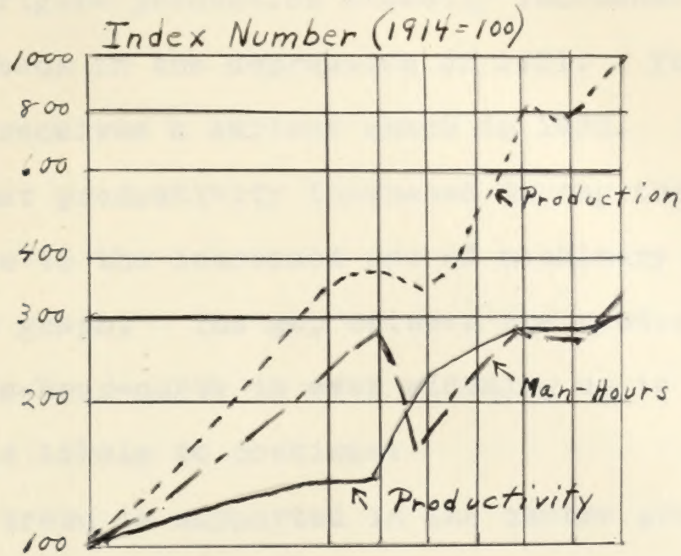
12. Nation's Business, March 1, 1930, p. 18

13. Automotive Trade Journal and Motor Age, March 1, 1930, p. 61

14. N.A.C.C., Facts and Figures of the Automobile Industry, 1929, p. 3

15. P. C., Recent Economic Changes in the U. S., Vol. 1, p. 148

FLUCTUATIONS OF THE PRODUCTION FACTORS OF THE AUTOMOBILE INDUSTRY



Index numbers are used to describe the change. In the upper figure production steadily increases with but a slight setback in the depression of 1921. The index for man-hours receives a serious check in 1920. It will be noticed that productivity increased during the same period. This is due to the increased use of machinery as shown in the middle graph. The gap between the production curve and the man-hour-curve is ever widening up to the present time and is likely to continue.

This trend is supported in the centre graph which shows the steady increase in the index of horsepower and the pronounced drop in the wage index, until the upward curve of horsepower just meets the downward trend of wages.

The last graph is even more emphatic in showing this change. With the increased use of horsepower per man hour the unit of prime cost drops sharply.

That these efficient conditions will be a permanent fixture is indicated by the fact that the manufacturers are establishing research laboratories and are employing hundreds of men to eliminate wasteful processes in order to increase the stockholders' dividends.

It is likely that the industry will continue for years in this prosperous condition. Any new industry which has grown so large as to necessitate an annual expenditure of eleven billions of dollars out of our national yearly in-

come of ninety billions a year,¹⁶ is certainly a vital factor in our prosperity.

When we also consider that it employs over four million people, directly and indirectly; that it has changed sluggish industries into dominating ones, as we shall see in the following chapters; then the question is not so much our dependence upon the automobile for continued prosperity but rather what we should have done without the automobile industry. There has not been any new industry started in recent years which shows any sign of approximating the growth of the motor-car industry.

16. Bent, Machine Made Man, p. 5

CHAPTER III

HENRY FORD'S ECONOMIC CONTRIBUTION TO THE INDUSTRY

No man in the automobile industry has done more than Henry Ford to promote national prosperity.

The early life of Henry Ford who as a boy was fascinated by, and inquisitive about, mechanical inventions and who later deserted farming in order to follow mechanics is a very interesting story, but we shall consider him only since the time he began to play a prominent part in the motor-car industry.

His first car, as we have already mentioned, was built in 1893. He improved this machine in 1898 and the Detroit Automobile Company was organized to manufacture and to sell his car.

This company and its successor were unsatisfactory to Ford and he resigned from both. The reason for his withdrawal from each company was disagreement over the proper price for a car. Ford believed in a cheap car while his associates wanted an expensive one.

On June 16, 1903, the Ford Motor Company, as we know it today, was organized. The total capital stock authorized was \$100,000 and of this amount \$28,000 was paid in cash.¹ Ford held 25 1/2 per cent. of the stock and he was

1. Ford Motor Company, Ford Industries, p. 5

not content until he acquired all of the stock which is now held by the Ford family.

In the new company Ford went ahead with his idea of a cheaply-priced car which could be sold in large quantities. As the demand for his cars grew, Ford, by his simplification and standardization, made possible the interchangeability of parts and the consequent mass production.

Ford plants are considered models. They are remarkable for their excellently-planned, well-lighted, clean factories.

This company was one of the first to be interested in time and motion studies. As a result, the first conveyor system was introduced and it now does the work of seventy men.² Conveyor belts have proved popular in every industry and they are now universally used.

Ford's first car was called Model A. Improvements were made on it until he introduced the famous Model T and his production of the latter numbered fifteen million. This model reigned in the low-priced field until General Motors introduced a low-priced car, the Chevrolet, which combined style and utility.

While Ford maintained in an interview given to the Wall Street Journal on May 26, 1927, that he could continue increasing his sales of Model T, the figures prove that his sales were decreasing to a serious degree, and that style

was now a decided factor in the marketing of automobiles. The following figures were taken from the Wall Street Journal in 1927 and reprinted in an A. W. Shaw publication.³

OUTPUT OF FORD MOTORS

	<u>1925</u>	<u>1926</u>
January	117,090	114,967
February	124,949	123,251
March	152,300	141,705
April	181,373	145,987
May	176,729	141,446
June	206,082	122,802
July	181,318	144,486
August	24,248	142,259
September	91,336	129,831
October	204,811	109,473
November	188,251	91,708
December	149,621	40,000

Ford worked on an improved gear-shift machine and he scrapped the old Model T. His new Model he again called "A". He had hoped that he would not be obliged to close completely his factories but this became necessary and by Christmas, 1926, all his men, the number of whom had grown to 200,000, were out of work while the machinery for the new model was installed.⁴

"It cost Henry Ford a cool hundred million to change from Model T to Model A. More than fifty per cent. of all his production machinery had to be replaced, re-designed or supplemented. To produce two gears in the new rear axle,

3. Vanderblue, Economic Principles, p. 85

4. World's Work, April 1930, p. 122

43,000 machine tools had to be altered, and 4,500 brand-new ones built. The dies which replaced the old ones alone cost \$5,000,000."⁵

Tremendous enthusiasm greeted the new Ford. Papers carried full-page advertisements describing the beauty and utility of this modern low-priced car.

In New York when the car was displayed, nearly one million people stormed the Company's showrooms to see it.⁶

When the new car met with such a reception all over the country and the stock speculators realized that Ford was back in the market as a buyer of steel and copper, the Exchange went on a rampage with a turnover of 2,900,000 shares in what the Times declared as a "Henry Ford Market".⁷

Ford had re-established his position, and his output for 1929 was 1,709,945 units.⁸

It is expected in the automobile trade that further improvements on the Ford are to be made. It is hinted that a newer Ford will be designed with a longer body, with more leg room, and with many mechanical improvements.⁹ Verification of this is difficult as it is hard to get news in regard to the Ford policies. This secrecy is possible because it is

5. Chase, Men and Machines, p. 103

6. World's Work, April 1930, pp. 124-126

7. Ibid

8. Barron's Weekly, April 14, 1930, p. 27

9. Automobile Trade Journal and Motor Age, December 1929, p. 74

really a one-man organization. This also accounts for its flexibility.

An examination of the Ford Company reveals that it is a highly integrated business of the vertical combination type.

It has a saw mill and a body plant producing wooden body parts, at Iron Mountain. These are located on a 455,000 acre tract of timber and ore land in the Upper Peninsula of Michigan. Iron ore is mined at Michigamme by the Imperial Mine for shipment to the River Rouge Plant.¹⁰

The company owns coal mines in Kentucky and West Virginia and these mines have a coal reserve of about 600,000,000 tons.¹¹

Three glass plants are owned by the Fords. One is situated at Glassmere, Pennsylvania, another at Highland Park, Michigan and the third is at River Rouge, Michigan. They are capable of producing 22,000,000 square feet each year.¹²

Ford also bought the Johansson Company. The Johansson gages are the world's standard system for controlling precision measurements in all mechanical industry. Mr. Johansson personally works at Dearborn for Ford.¹³

The Detroit, Toledo, and Ironton Railroad, which the Fords control, connects with every Eastern trunk line and

10. Ford Motor Co., Ford Industries, p. 6

11. Ibid

12. Ibid

13. Ibid, p. 7

affords unusual shipping facilities.¹⁴

Ford is also in the airplane business.

His factory at Dublin, Ireland, is used exclusively for the manufacture of tractors.

Boats are made at River Rouge, Michigan.

The Company makes its own artificial leather in order to insure a constant supply and to keep the price low.¹⁵

Ford is an enemy of waste. Some of his by-products are coal tar, amonium sulphate, motor benzol, illuminating gas, coke, charcoal briquets, hardwood pitch, wood alcohol, calcium acetate, Portland cement, and slag (for grading roads).¹⁶

The Ford Company is far from self-sufficient, notwithstanding its vertical combination. More than 2,300 firms in the United States supply material to the Ford Companies.¹⁷

The adaptability of the Ford plants to almost any kind of work was illustrated in the World War. After Ford's Peace Ship had failed ignominiously, the auto manufacturer devoted himself untiringly to war work to help the American government.

Ford built 5,000 tractors for the English in 1917 and delivered some of them two months from the day he started to

14. Ibid

15. Ibid, p. 24

16. Bent, Machine Made Man, p. 177

17. Boston Post, March 24, 1930, p. 24

manufacture.

Other war products of the Ford plants were as follows:¹⁸

4,000,000 parts for the Liberty Motors used
in airplanes.

10,000 gun caissons.

3,000,000 doughboy helmets.

Many listening devices, number not furnished.

Many speedy Eagle motor boats, as many as
eighteen a month.

In every case the Ford factories produced their articles far below the government's estimates. The amazing thing is the speed and efficiency with which Ford went into the manufacture of products with which he was unacquainted.

Henry Ford's financial policy has been the old New England one of "ploughing his earnings back into the business". This is responsible for the strong financial position of his company.

In 1927 and 1928 when Ford was changing from Model T to Model A, the average yearly loss was close to \$65,000,000. But his first normal year of production with his new car resulted in net earnings of \$81,797,861.¹⁹ Because of Ford's secrecy about his financial affairs, it may be possible that his earnings were much greater and that large dividends were withdrawn by the Ford family. The eighty-one millions of profit were calculated by comparing his surplus account in 1929 with that of 1928.

18. Simonds, "Henry Ford, Motor Genius," p. 134

19. Barron's, April 14, 1930, p. 27

Ford's balance sheet of December 31, 1929 is as follows:²⁰

Real Estate	\$154,320,351
Machinery and Equipment	138,928,264
Inventory	118,883,081
* Cash	346,937,496
Deferred Charges	2,008,803
Total Assets	<u>\$761,077,995</u>
Capital Stock	17,264,500
Accounts Payable	73,056,928
Reserves	6,329,143
Profit and Loss Surplus	664,427,424
Total Liabilities & Capital	<u>\$761,077,995</u>

* Includes notes and accounts receivable, securities, patent rights, etc.

From an accounting standpoint, Ford's balance sheet is very interesting. It is a model one because of its strong financial features.

Note the large amount of working capital, or easily available cash. Over half of the Ford assets are in liquid condition.

Ford's greatest competitor is the General Motors Corporation. Some interesting comparisons between the two are made possible by recent figures of Barron's Weekly.²¹

	<u>FORD MOTORS</u>	<u>GENERAL MOTORS</u>
1929 Sales	\$1,000,000,000	\$1,504,404,472
1929 Output (Units)	1,709,945	1,899,267
1929 Profits	81,797,861	248,282,268
Surplus	664,427,424	380,560,273
Capital Stock	17,264,500	573,916,000
Current Assets	465,820,577	368,960,944
Current Liabilities	73,056,928	117,673,163
Working Capital	392,763,649	251,287,781
Total Assets	761,079,996	1,324,889,764

20. Ibid

21. Ibid

General Motors Corporation manufactures many more articles than the Ford Company and a more detailed study of both companies, if it were possible to make such a study, might reveal that the General Motors was as efficiently managed as the Ford Motor.

Ford's earnings on capital amount to roughly 474 per cent. while the profits of General Motors are 43 per cent. of the capital stock.

Ford's profits are not withdrawn but are retained in the business. General Motors finds it necessary to pay dividends to its clamoring stockholders. Ford's relatively small issue of stock is held by his family and no dividends are necessary.

Note that Ford with fewer products almost equals the total of General Motors' varied output.

While the building of this enormous Company was an economic feat in itself, Ford has made other economic contributions.

Perhaps the greatest was his accomplishment in winning the famous Selden patent litigation.

An excellent account of this controversy may be found in the May, 1921 issue of "World's Work".²² Briefly summarized, the chief facts are as follows:

George B. Selden, a patent lawyer, invented a gasoline

22. World's Work, May 1921, pp. 61-62

automobile in 1879. He sold this patent to the Electric Vehicle Company which collected royalties and returned a certain percentage to Selden.

The Company successfully prosecuted any infringement of the patent. Ford, however, refused to pay the royalty. A bitter law suit lasted eight years.

Ford lost in the United States District Court in 1909 but he appealed to the United States Circuit Court of Appeals in 1911. Judge Noyes held that the Selden patent was valid but that Ford did not infringe because he designed his engine on the Otto type while Selden's engine was of the Brayton type.

This decision ended all royalties but if it had not been for Ford's courage the industry would have been seriously hindered by these royalties.

It has been said that Henry Ford in this fight was supported by the French and other interests who furnished him inexhaustible capital.²³

As an outgrowth of Ford's victory, there was established the National Automobile Chamber of Commerce which replaced the Electric Vehicle Company. This Chamber brought into being the cross-licensing agreement which enables all in the industry to use patents free of charge. There are about

23. Duncan, World on Wheels, p. 919

eight hundred such patents held by the Chamber.²⁴ Patents which involve a radical departure from present day inventions do not come under this agreement. In cases of this kind it is felt that a great invention deserves a royalty.

Another Ford contribution to the study of economics was his unorthodox idea of wages. He believed that well-paid workers created prosperity, and that the more money a man earned, the greater was his purchasing power.

He established a minimum wage of five dollars and the maximum depended on ability. Later he raised the minimum to six dollars a day.

Although Ford is given credit for the idea of high minimum wages it is said that the present Senator Couzens of Detroit, a former business associate of Ford, originated the idea. It is related that he had to argue bitterly with Ford to make the latter see its advantages.²⁵

The result of the experiment was that the Ford Company attracted the best labor in the State and also from the surrounding country. Other companies were obliged to raise wages in order to retain their forces. This generous distribution of wealth provided added purchasing power and a greater demand for Fords. More Fords meant more purchases of automobile-manufacturing materials. Prosperity in other

24. World's Work, May 1921, pp. 62-63

25. McManus-Beasley, Men, Money and Motors, p. 154

industries added more general purchasing power and the benefits are incalculable.

Ford's plants have the lowest labor turnover of any large industrial institution.²⁶

The Ford Company hires sub-standard men, those suffering from some physical defect, and adjusts these men to some productive phase of the business.

Ford was one of the first men to advocate an eight-hour day. He is truly interested in the welfare of his men.

Many believe that Ford has carried his interest in the men to a point which borders on paternalism. The prying into employees' private affairs by his social workers has gone beyond the point of wisdom. His latest intention to spy on the personal habits of his employees, especially with regards to their drinking of liquor, borders on economic slavery.

Ford dealers have also been witness to some of Ford's autocratic tendencies. In 1923 when he needed cash, he did not hesitate to unload his stock on unwilling dealers. He demanded that they pay cash in advance for orders which they did not want.

That he is still ignoring his dealers and that many of

26. Ford Motor Company, Ford Industries, p. 111

them are rebelling is manifest by an article which appeared in the "Business Week" of April 2, 1930.²⁷ This rebellion is caused by the recent reductions in November 1929, which cut retail prices \$15 to \$50. The dealers object to the fact that 90 per cent. of this reduction was taken from their already meagre profits.

Some of the requirements which they consider unfair are as follows:

1. "Dealers are obliged to take a quota of Ford Trucks and Lincoln Cars whether they need them or can possibly sell them.

2. "Ford's treatment of his contracts as 'scraps of paper'.

3. "Factory exercising authority over amount of money to be spent for show rooms, garages, and similar investments in the business.

4. "The requirement that all garage equipment must be bought from a recognized Ford source regardless of relative need or price of equipment."

Ford has also received much unfavorable criticism for his attacks on the Jews, for his novel views of religion, and for other unwise utterances outside of his own field.

Nothing, however, can ever detract or take from him his rightful place in the automobile industry. He has con-

tributed much new scientific information on industrial economics. Mass production, higher wages and correspondingly lower costs, and unceasing scientific research, are terms synonymous with the name of Henry Ford.

With the advent of the large number of automobiles, came the need for good roads. Cobble-stone streets were satisfactory for horse-drawn vehicles but they were not pleasing to motorists. One of Deussen's early ideas, Grand Street, was paved with cobble-stones as late as 1912. Cobble-stone roads are now a necessity as it is estimated that eight per cent. of the automobile traffic is now for pleasure.

The United States was interested in good roads before the war of automobiles, however. National aid towards road building was approved as far back as 1838 when President Van Buren approved an appropriation of \$30,000 to build the Cumberland Road. By 1890, the total Congressional appropriation had grown to \$1,000,000. In 1914, the thirty-fourth appropriation was a total of nearly \$7,000,000.

The people were so delighted with the early automobiles that they began to demand a higher degree of safety and more rapid delivery of goods.

The people began to demand a higher degree of safety and more rapid delivery of goods.

1. Chilton, Eugene and E. J. Chilton, "The Automobile", 1914, p. 40

CHAPTER IV

EFFECT OF THE AUTOMOBILE ON AMERICAN ROADS

With the advent of the large number of automobiles, came the need for good roads. Cobble-stone streets were satisfactory for horse-drawn vehicles but they were not pleasing to motorists. One of Boston's main streets, Tremont Street, was paved with cobble-stones as late as 1912. Smooth-surfaced roads are now a necessity as it is estimated that eighty per cent. of the automobile riding is done for pleasure.

The United States was interested in good roads before the use of automobiles, however. National aid towards road building was approved as far back as 1806 when President Jefferson approved an appropriation of \$30,000 to build the Cumberland Road.¹ By 1820, the total Congressional aid for this road totalled more than \$1,500,000. In 1844, the thirty-fourth appropriation made a total of nearly \$7,000,000.²

The people were so delighted with the newly constructed road that travel increased to a marked degree and the sale of wagons multiplied rapidly.

The country built roads slowly as necessity demanded

1. Chatburn, Highways and Highway Transportation, p. 63

2. Ibid, p. 65

and in 1904 Congress and the United States were amazed when Representative Brownlow introduced a bill asking for an appropriation of \$24,000,000 for road building.³ The bill was not passed but it was at least a warning of what was to come eventually.

By 1914, there were more than one million automobiles in this country and the drivers were demanding good roads. This demand is reflected in the number of bills, forty-nine, which were introduced by the 63d Congress, all of which sought appropriations for road building. Ten of these were introduced by Senators and thirty-nine by Representatives.⁴

As a result of this growing interest a joint congressional committee studied the situation. In their report of January 21, 1915, they stated that they had sent a questionnaire through the country asking if national aid was needed. Of 10,000 answers, 97 per cent. favored national aid.⁵

The outgrowth of the investigation was the enactment of the famous Federal Aid Highway Act of 1916 which is now Public Law 156, 64th Congress. This bill provides that the national government will furnish a dollar for every dollar the state governments are willing to spend for improved roads.

3. Ibid, p. 152

4. Ibid, p. 153

5. Ibid

It also provides that the Secretary of Agriculture will co-operate with the State Highway Commission in each state. Together they will plan and approve road-building enterprises.

The Act is very liberable in defining post roads which it will help construct. "The term 'rural post road' shall be construed to mean any public road over which the United States mails now are or may hereafter be transported, excluding every street and road in a place having a population, as shown by the latest available federal census, of two thousand five hundred or more, except that portion of any such street or road along which the houses average more than two hundred feet apart."⁶

"The Federal Bureau of Public Roads in co-operation with the state authorities worked out a well co-ordinated network of 185,772 miles of principal roads throughout the country of which about one-third has been improved."⁷

The dominating idea of these selected principal roads is to connect every town of 5,000 or more people with every town of similar size by an improved highway. The work is planned to be completed by 1931.⁸

The amount of aid given to the states is based upon the ratio of the area of a state to the area of the country, the population of the state to the national population, and the

6. Ibid, p. 154

7. President's Committee, Recent Economic Changes, 1929,
p. 246, Vol. I

8. Automobile Trade Journal, December 1, 1924, pp. 216-220

mileage of a state's rural post roads to the mileage of the national rural post roads.

November 9, 1921 a new Federal Highway Act was passed. It corrected some of the shortcomings of the 1916 Act. One new feature provides that the minimum allotment to any state shall not be less than one-half of one per cent. of the total national appropriation. This helps the smaller states of Delaware, New Hampshire, Rhode Island and Vermont.⁹

Another change rules that a state must select 7% of its total mileage with a view of best serving the needs of the state.⁹

The 1921 Act increases the appropriation to states which have a large area of desert or mountainous land.

Recent appropriations for national aid are increasing tremendously. In an interview given to the press by Representative Tilson of Connecticut, Republican leader of the House, he states that Congress will appropriate \$125,000,000 each year for the next three years, as an aid to road-building.¹⁰

Tilson has high hopes that this will decrease the large number of unemployed. His statement is interesting when we remember that the Bureau of Public Roads has also made a statement saying that the great increase in road-building since 1919 has not resulted in the employment of "appreci-

9. Chatburn, Highways and Highway Transportation, p. 339
10. Boston Post, March 31, 1930, p. 9

ably more men".¹¹ The improvements in road-building machinery, as in all other machinery, add to the problem of technological unemployment.

Without the aid furnished by the nation, we never could have made such progress in road-building. That a great deal remains to be accomplished can be learned by a few statistics on our present condition.

There are over three million miles of highways in the United States, exclusive of city streets, or almost 40% of the world's total. Of this United States number there are 2,390,000 miles of unimproved roads or 75 per cent. of the total. The miles of permanent, durable roadway are 167,000, or about 5 per cent. of the total mileage.¹²

That we are increasing our improved highways is acknowledged in the same article which estimates that in 1930, "We shall spend \$1,650,000,000 of which \$800,000,000 will be spent on state roads and \$850,000,000 on country roads. If expenditures by cities for streets are added the total will come to about \$2,500,000,000."

From another source¹³ we find that the total mileage surfaced in 1928 was 36,000 miles. The total expenditures the same year were \$1,500,000,000 for new construction and the amount paid for the construction and maintenance by

11. P. C., Recent Economic Changes, Vol. I, p. 248

12. The Business Week, March 26, 1930, p. 7

13. N.A.C.C., Facts and Figures of the Automobile Industry, p. 38

cities of their streets was an additional \$500,000,000.

In the United States the construction of concrete roads increased from 7,000 in December, 1918, to 50,000 at the end of 1927.¹⁴

The automobile owner assumes his share of the cost of building new roads. There are registration fees, license fees, gasoline taxes, personal property taxes, and other taxes which he must pay. In 1928 it was estimated that he paid at least \$808,000,000 in motor taxes.¹⁵

It is also estimated that of the total expenses of a municipality, 9 per cent. of these expenses are for street maintenance.¹⁶

Massachusetts is launching in 1930 the biggest road-building programme ever undertaken in this State. It is planned to build sixty miles of new highways and to reconstruct seventy-five miles in addition.

An expenditure of \$20,000,000 is to be appropriated. Of this amount \$15,000,000 is from the State Treasury, \$1,500,000 from the Federal Aid Act, and the remaining \$3,500,000 from counties and municipalities.¹⁷ These figures do not include expenditures which municipalities are intending to pay for the improvement of their own highways.

14. P. C., Recent Economic Changes, p. 247, Vol. I

15. N.A.C.C., Fact and Figures of the Automobile Industry, p. 76

16. Ibid, p. 86

17. Boston Post, March 20, 1930, p. 30

The importance of the extra expenditure is appreciated when it is realized that in 1929 the expenditure was \$16,892,000, 1928 - \$14,641,000, 1927 - \$15,204,000. It is hoped that the extra expenditure will help decrease the number of unemployed.

Massachusetts, in 1928, had 8,485 miles of surfaced roads: the state highways numbered 1,565 and the local roads, 6,920.¹⁸

From the preceding figures one can realize the enormous effect of the automobile on American roads. Billions of dollars are spent for wages and materials in the building of automobile roads. Thousands of employees are given permanent employment in this comparatively new industry and many firms are constantly employed in the manufacture of machinery and supplies for road-building.

That road-building enhances property values is self-evident. With good roads comes a natural desire to clean and paint property. Westchester County, New York, insists that it was an expenditure of \$3,750,000 on good highways that increased the land values by \$500,000,000.¹⁹ This increased value will, of course, result in larger tax returns.

Up to this point in the chapter we have talked about

18. N.A.C.C., Facts and Figures of the Automobile Industry, 1929, p. 38

19. N.A.C.C., Facts and Figures of the Automobile Industry, 1928, p. 27

the economic expenditures and savings in dollars and cents. There is, however, a more beneficial effect of good roads on the health of the American people. We found that the auto necessitated good roads and now we find that the latter improves the health of Americans.

Clean, smooth roads are healthful. They invite us into the country for relaxation. They bring the doctor to us more quickly in time of need. They save lives by allowing ambulances to speed with their patients to the hospital.

Better health because of the automobile means better production in the office, home, school, and factory. Such an economic gain is incalculable in monetary value but it is a factor which deserves consideration.

In 1929, the world production of petroleum was 1,483,000,000 barrels. This was a gain of 104 per cent over 1925.¹ Of this total, the United States produced 1,036,000,000 barrels, or 69.5 per cent of the total.² This industry employed directly 12,000 persons in 1929 and all work, over 150,000 persons.³

The United States from 1925 to 1929 has produced nearly

1. *Statistical Abstract*, April 1930, p. 35.
2. *Statistical Abstract*, April 31, 1930, p. 18 (Crude Petroleum).
3. *U.S.A.C.*, 1929 - *People and Progress of the Automobile Industry*, p. 12.

CHAPTER V

ECONOMIC CHANGES IN ALLIED INDUSTRIES

One reason for the unimpeded growth of the automobile industry has been the abundant supply of materials available both for the manufacture of the machine and the consequent operation of it. In this chapter we shall study the effect of the growth of the giant industry on its dependent industries.

OIL

One industry which has become a leader through the introduction of the automobile is the oil industry. This may be more strikingly emphasized by recalling that prior to the invention of the motor-car the principal product of petroleum was kerosene and the by-product was gasoline. Now the order is reversed.

In 1929, the world production of petroleum was 1,488,000,000 barrels. This was a gain of 12.4 per cent. over 1928.¹ Of this total, the United States produced 1,006,000,000 barrels, or 104,526,000 more than in 1928.²

This industry employed directly, in gasoline refining and oil work, over 150,000 persons.³

The United States from 1860 to 1925 has produced sixty-

1. Nation's Business, April 1930, p. 18

2. Boston Globe, March 31, 1930, p. 12 (Overproduction Control Meets Some Success - Yetman)

3. N.A.C.C. 1929 - Facts and Figures of the Automobile Industry, p. 14

four per cent. of the world's supply. During this period we have marketed 7,000,000,000 barrels while the combined total of England, France, and Germany was only 19,000,000 barrels.⁴

While the oil industry is in a flourishing condition and is one of the most prosperous of American industries, grave fears are expressed for the future. It has been commonly accepted that our reserve supply of oil is only 8,000,000,000 barrels. Therefore at the rate we are producing, 1,000,000,000 barrels a year, our supply will last about eight years.

Calvin Coolidge, when serving as President, appointed a Petroleum Conservation Board which reported in 1927 that our supply, unless we discovered new fields, would last for only six years.⁵ President Hoover has continued the Committee and its next report should be interesting.

Almost all writers on the subject have a pessimistic attitude about the future. There is one notable exception, The American Petroleum Institute. This Association appointed a Committee of Eleven to aid the Conservation Board. They are the men most vitally concerned in the industry and the ones most anxious to know of any conceivable shortage.

Their report,⁶ printed in a large volume independently

4. Lippincott - Economic Resources and Industries of the World, p. 156

5. Chase, Men and Machines, p. 303

6. Committee of Eleven, American Petroleum Supply and Demand, pp. 3-5

of the Conservation Report, denies that there is any imminent danger of exhaustion of the petroleum reserves of the United States. They report that petroleum recoverable by present methods of flowing and pumping from existing wells consists of 5,300,000,000 barrels of crude oil. But they remove any doubt of a shortage when they predict that after these barrels are removed there will still remain 26,000,000,000 barrels of crude oil which can be recovered by improved processes such as flooding with water, the introduction of air and gas pressure, and mining.

They increase confidence to a higher degree when they maintain that by deep drilling below oil sands now producing, additional oil fields will be discovered. They assert that the major oil reserves of our country lie in some 1,100,000,000 acres of land underlain by sedimentary rocks, in which geology indicates oil is possible. They promise an unlimited supply of oil from the vast deposits of shale, coal and lignites from which liquid fuel may be extracted.

This Report insists that it will be a short time only before structural mechanical changes in the automobile will result in double the present mileage from a gallon of gasoline and a consequent saving of the supply. Improved methods of refining, especially "cracking", are already resulting in a larger yield of gasoline from each gallon of crude oil.

Finally, the report emphatically answers the critics of the industry when it says, "Waste in the production, trans-

portation, refining and distribution of petroleum and its products is negligible".

Inasmuch as the men who wrote this report are interested in the industry and know it thoroughly, their report sounds like a reasonable statement of present and future conditions of the industry. It is much more authentic than the Conservation Board Report which predicted exhaustion in 1933, for this prediction is unsupported by actual conditions.

But regardless of the future resources of oil hidden in our soil, we are in a race with Great Britain for the control of the world supply of oil. A recent book on the subject states, "All the known oil fields, all the likely or probable oil fields, outside of the United States itself, are in British hands or under British management or control, or financed by British capital".⁷

Although small companies exist profitably in the oil industry, the large companies are competing for control. For 1927 we have the figures showing the participation of large companies in world production with their corresponding working capital.

<u>Name</u>	<u>Company Production</u> ⁸	
	<u>Barrels</u>	<u>Working Capital</u>
Dutch Shell	344,200	\$217,000,000
Standard (New Jersey)	214,700	598,000,000
Gulf	212,500	110,000,000
Standard (California)	150,000	95,000,000
Standard (Indiana)	118,000	167,000,000
Standard (New York)	100,000	220,000,000
Texas Corporation	107,500	127,000,000
Anglo-Persian	102,600	34,500,000

7. Denny, America Conquers Britain, p. 226

8. Denny, We Fight For Oil, Appendix E, p. 283

The oil war is a furious one and many of our pessimistic writers insist that it will end in a bloody war. They base this fact on the testimony of military authorities who claim that the possession of oil was directly responsible for the winning of the last war. They conclude logically that, unless conditions change greatly, oil will play a prominent part in future wars.

The latest obtainable figures for the world's petroleum production by countries follow:⁹

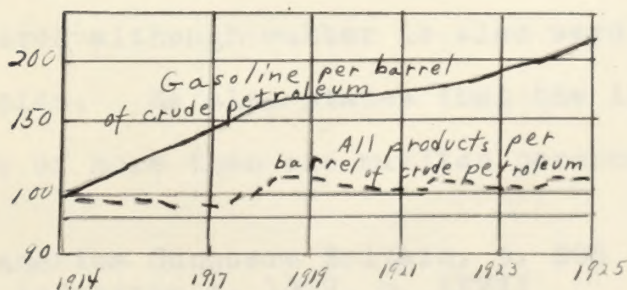
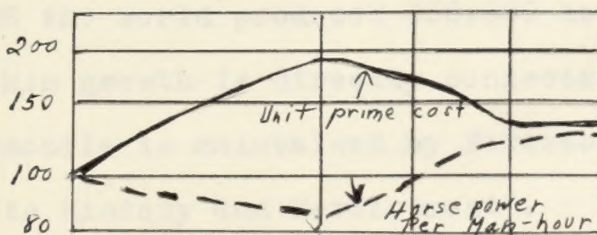
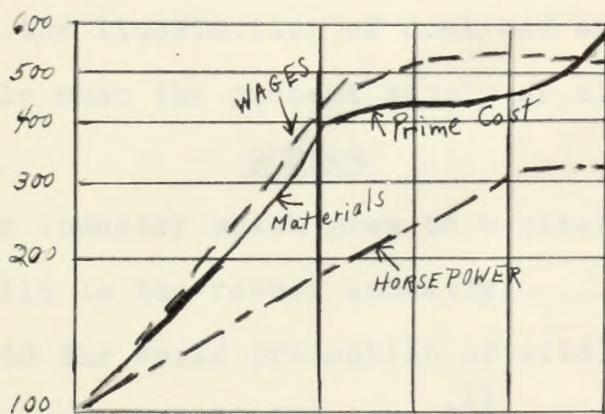
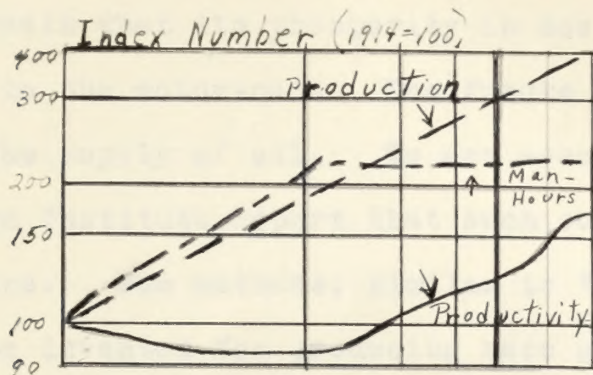
<u>World Production of Oil</u> <u>1928</u>	
	<u>Barrels (42 gallons each)</u>
United States	902,000,000
Mexico	50,150,000
Russia	87,800,000
Venezuela	106,000,000
Persia	42,030,000
Dutch East Indies	28,500,000
Rumania	36,000,000
Columbia	19,900,000

The world production in gallons for 1928 was 15,841,686,000.

The following chart is offered to prove conclusively that what is happening in other industries is also true of the oil industry. Each section emphasizes one central fact that an increase of horsepower, due to improved machinery, results in a decrease of labor hours, and a corresponding decrease in unit cost.

9. Moody's Industrials 1929, p. XXIX.

FLUCTUATIONS OF PRODUCTION FACTORS OF THE PETROLEUM REFINING INDUSTRY¹⁰



Our study of the effect of the automobile on the oil industry reveals that its prosperity is due primarily and principally to the motor-car. The future prosperity depends upon the supply of oil. We are assured by the American Petroleum Institute Report that such supply is adequate for many years. New methods, similar to "cracking", are certain to be invented for producing more gasoline from the crude oil. Experiments have proven already that oil may be produced by the liquefaction of coal and such a process will be profitable when the present supply of oil is exhausted.

RUBBER

Another industry which grew to a great size because of the automobile is the rubber industry.

"In 1908 the world production of wild and plantation rubbers was less than 70,000 tons."¹¹

In 1928 the world produced 658,000 tons.¹²

That this growth is directly connected with the growth of the automobile is maintained by Firestone in his book, "Rubber - Its History and Development". He estimates that two thirds of the rubber produced goes into the manufacture of rubber tires although rubber is also used in 30,000 different articles. He also states that the industry employs the services of more than one million persons.¹³

11. Denny, America Conquers Britain, p. 205

12. Moody's Industrials, 1929, p. XXVII

13. P. 10

Recent statistics increase Firestone's estimate. It is now stated that of the rubber manufactured in the United States in 1929, 85 per cent. was used by the automobile industry.¹⁴

The future of this industry is dependent also upon the available supply of raw material. Unlike oil, the United States depends entirely on foreign countries for her supply of rubber. Our present struggle to get rubber can be explained by tracing the increased use of rubber from the beginning.

Rubber was in use as early as 1521 in Mexico. The natives played even at that early date with balls made from rubber. In 1536 Portuguese missionaries in Brazil found rubber used for shoes, clothes, and water bottles. In 1776 Priestly discovered the erasing qualities of rubber. In 1820, Macintosh, in England, manufactured rubber raincoats. In 1839 Charles Goodyear made the greatest economic discovery in regard to rubber when he learned of vulcanization.¹⁵

In 1876, Wickham, an Englishman, smuggled from Brazil rubber seeds which he planted in Kew Gardens, England. From the English plants, seeds or slips were transported to the East to found the great British and Dutch plantation rubber industry.¹⁶ These plantations now number 300,000,000 trees.¹⁷

14. Boston Sunday Globe, April 13, 1930, p. 13

15. Firestone, Rubber - Its History, p. 9

16. Denny, America Conquers Britain, p. 205

17. Firestone, Rubber - Its History, p. 10

The demand for rubber increased constantly until in 1921 a serious case of overproduction in the industry occurred. The price of rubber decreased alarmingly and employees of American rubber companies told of huge surpluses completely eliminated from the books by the reduction in inventory figures. Some inventories were marked down as much as \$20,000,000 in an individual company.

In November, 1922, the Stevenson plan was passed in England. This bill sought to reduce the export of rubber. It taxed, by means of a sliding scale, the exportation of rubber. This plan succeeded in limiting production and restoring the price of rubber. For a short time the plan succeeded. American rubber manufacturers resented this interference with the economic laws of supply and demand and they felt that prices were too high.

Herbert Hoover, Secretary of Commerce during this period, led the fight against the Stevenson Act. "He encouraged the manufacture of tires which would wear longer. He increased reclamation and utilisation by the industry of used rubber. He stimulated research in synthetic rubber and other substitutes. He initiated experiments in rubber growing in the United States and aided American capital to find and obtain rubber land overseas. By 1923 more than 40 million pounds of reclaimed rubber and 100 million pounds of scrap and old rubber were entering world trade annually."¹⁸

18. Denny, America Conquers Britain, p. 209

England must have feared the eventual independence of the United States in rubber and the consequent loss to her of a great industry because in 1929 the Stevenson plan was abandoned. Now, economic factors alone will decide the price of rubber and the "pegging of prices" is at an end.

The Plan did one excellent thing. It taught us our dependence on foreign rubber and the possible serious interruption to the automobile industry. While America has not accomplished a great deal with synthetic rubber, we are now seriously considering the problem, something which we had not done previously.

Thomas Edison has recently announced that there are 1200 species of plants that have rubber in their veins. He also enthusiastically predicts that rubber will in the future be manufactured from the American weed, golden-rod, at an approximate cost of sixteen cents a pound, about sixty cents less than the present manufactured rubber.¹⁹

Congress voted in 1923 an appropriation of \$500,000 to investigate sources of supply. Harvey Firestone is conducting independent investigations in Liberia, Africa and also in the Philippines. He has hopes of annually producing 200,000 tons a year from his Liberia plantations.²⁰

That the United States is determined to be independent

19. Ibid

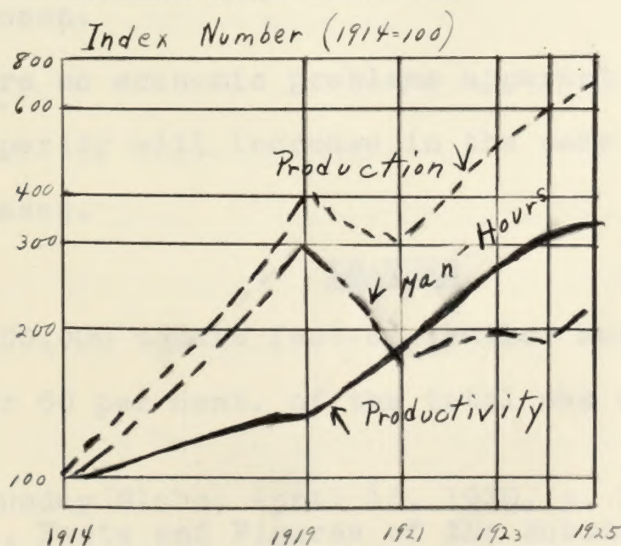
20. Firestone, Men and Rubber, pp. 255-6

is indicated by Firestone's activities. He has leased 1,002,000 acres of land in Liberia for ninety-nine years. He contemplates spending \$100,000,000 to reclaim this jungle land. Native laborers to the number of 350,000 are employed. This development will necessitate the building of ports and harbors, roads, hospitals, sanitation units, lines of communication, and the development of hydro-electric power.²¹

Firestone wants to make Liberia one of our greatest importers and once again we have, literally, an example of the far reaching effects of the automobile.

In the American manufacture of crude rubber we have again the time-saving machinery. The following chart needs no explanation. The increase of horse-power and the decrease of man-hours result in increased productivity.²²

FLUCTUATION OF PRODUCTION FACTORS OF THE RUBBER TIRE INDUSTRY



21. Ibid, pp. 268-9

22. P. C., Recent Economic Changes, p. 150, Vol. I

PLATE GLASS

This industry has also grown with the increase of the motor-car. In 1929 sixty-seven per cent. of all the plate glass manufactured in the United States was used in the manufacture of automobiles.²³ The number of square feet produced is not available for 1929.

It is evident that there has been a decrease from 1928, in which year the plate glass used in the automobile industry was seventy-four per cent. of the total production. In 1928, production was 130,649,435 square feet. The automobile used 97,422,801 square feet of the total.²⁴

In 1928, this industry employed over 15,000 persons.²⁵

Henry Ford's plants alone produce annually, as we have previously mentioned in this thesis, over 22,000,000 square feet of plate glass. Ford also has revolutionized this industry by manufacturing glass in sheets, something which had been unknown.

There are no economic problems apparent in this industry and its prosperity will increase in the same ratio as the automobile increases.

LEATHER

Of 51,900,000 square feet of leather manufactured in 1928, 31,500,000 or 60 per cent. of the total was used in the manu-

23. Boston Sunday Globe, April 13, 1930, p. 13

24. N.A.C.C., Facts and Figures of the Automobile Industry, 1929, p. 13

25. Ibid, p. 14

facture of automobiles.²⁶ In this same year over 9,000 persons were employed in this industry.²⁷

It will be interesting to watch the effect on the leather industry of the improvements in the style of cars. More cushions and fewer leather coverings are being used in the new machines.

There will always be a demand for leather while tops continue to be made of this material.

HARDWOODS

Eighteen per cent. of the total production of lumber and hardwoods in 1929 was used in automobile manufacture.²⁸

This is a slight reduction from the 1928 figures. In that year, of a total production of 5,400,000,000, 18.8 per cent. or 1,020,000,000 board feet were used.²⁹

There are 17,000 workers in this industry whose efforts result in increased automobile production.³⁰

In considering this industry it is of interest to know that the original forests of the United States covered 350,000,000 acres. Carelessness, as in our oil production, soon reduced this area. Forest fires were the greatest destroyers but the tremendous demand for lumber for construction purposes, newspaper production, and automobile

26. N.A.C.C., Facts and Figures of the Automobile Industry, 1929, p. 13

27. Ibid, p. 14

28. Boston Sunday Globe, April 13, 1930, p. 13

29. N.A.C.C., Facts and Figures, p. 13

30. Ibid, p. 14

production account for part of the large decrease. In 1927 the area was about 158,000,000 acres.³¹

So serious was the situation that an educational policy, striving towards conservation, has been preached for years. It is estimated that in thirty years we shall be seriously in need of lumber.³²

Canada contains one of the greatest sources of timber in the world but inroads are being made by the export of huge quantities to the United States.

ALUMINUM

The total production in 1928 of aluminum was 90,000 tons. Of this total, 25,000 tons or 27.7 per cent. were used in automobile manufacture.³³ The value of this production was \$47,899,000, an increase of 22 per cent. over 1927. "The automobile industry is the greatest consumer of aluminum, but large quantities are used in shingles, corrugated sheets, furniture, airships, railway cars, and household utensils."³⁴

The number of aluminum workers connected with the automobile industry in the United States is not given separately. We do know that the combined number employed in lead, copper, tin, nickel and aluminum amounts to 16,000 persons.³⁵

31. Lippincott - Economic Resources and Industries of the World, pp. 467-9

32. Chase, Men and Machines, p. 305

33. N.A.C.C., Facts and Figures, 1929, p. 13

34. Commerce Yearbook, 1929, Vol. 1, pp. 416-7

35. N.A.C.C., Facts and Figures, 1929, p. 14

Due to the increased use of aluminum in the new cars, this industry should look forward to an additional gain of business.

COPPER

Fifteen per cent. of the world's copper found its way into automobile production in 1929.³⁶ This is an increase over 1928 when 924,500 tons were produced, and of this number, 135,000 tons or 14.6 per cent. went into the manufacture of motor-cars.³⁷

The Americas produce about 80 per cent. of the world's total. The United States produces about 54 per cent. Europe produces about 7 per cent. and looks to America for its supply.³⁸

That we may regret the fact that we have not conserved our copper is indicated by the following statement: "At the present rate of exploitation we shall see the practical end of copper mining in the United States in the present generation".³⁹

TIN

Of the total tons of tin delivered in the United States (78,865), in 1928, the automobile industry used 19,000 tons or 24.1 per cent. of the total.⁴⁰

As in the case of rubber, the United States depends entirely on foreign countries for its supply of tin. Almost

36. Boston Sunday Globe, April 13, 1930, p. 13

37. N.A.C.C., Facts and Figures, 1929, p. 13

38. Lippincott - Economic Resources and Industries of the World, pp. 177-8

39. Chase, Men and Machines, p. 304

40. N.A.C.C., Facts and Figures, p. 13

one-half of the world's production is imported into this country. Alaska, South Dakota, and California have small placer mines but these are negligible when compared with our total requirements.

Most of our imports of tin come from British Malaya direct, and indirectly from there by way of the British Kingdom. Large quantities also come from the Netherland East Indies.⁴¹

IRON AND STEEL

The automobile industry, in 1929, used 19 per cent. of all the iron and steel manufactured.⁴²

Persons in the iron and steel industry to the number of 65,000 helped produce automobiles.⁴³

That we may face a shortage in iron ore in the years to come is proved from the following facts.

Charles M. Schwab said in 1929 that our annual production of steel for the following ten years would approximate 50,000,000 tons a year.⁴⁴ "The iron ore reserves of the United States are estimated at 4,700,000,000 gross tons. Of this 3,500,000,000 gross tons are in the Lake Superior area, 355,000,000 in the Birmingham district, and 260,000,000 compose the liminite ores in northeastern Texas."⁴⁵

41. Commerce Yearbook 1929, Vol. 1, pp. 418-9

42. Boston Sunday Globe, April 13, 1930, p. 13

43. N.A.C.C., Facts and Figures, 1929, p. 14

44. Nation's Business, July 1929, p. 11

45. Lippincott, Economic Resources and Industries of the World, p. 117

The lake region of America is the greatest single source of iron ore in the world. It has all the advantages of cheap transportation to many markets and this accounts for the development of this region. In 1925 the three leading producers of iron in the world were as follows:

United States	61,908,000 tons
France	35,176,000
United Kingdom	10,306,000

Of the total United States production, the lake region produced 57,143,000 tons. That this is a regular occurrence is maintained by Lippincott who says that 85 per cent. of the yearly United States total comes from the lake region and 10 per cent. comes from the Birmingham district.⁴⁶

MISCELLANEOUS INDUSTRIES AFFECTED

The lead industry contributed 27 per cent. of its domestic-ore production to the building of automobiles.⁴⁷

This was an increase over 1923 when of a total production of 624,000 tons, only 160,000 tons or 25.6 per cent. of the total was used.⁴⁸

The following facts were taken from the 1928 statistics, as the 1929 figures are not available:⁴⁹

46. Ibid, pp. 116-117

47. Boston Sunday Globe, April 13, 1930, p. 13

48. N.A.C.C., Facts and Figures of the Automobile Industry, 1929, p. 13

49. Ibid

Zinc produced	594,500 tons
Used in the auto industry	27,000 tons
Per cent. of the total	4.5
Nickel used in the United States	50,000,000 pounds
Used in the auto industry	14,000,000 pounds
Per cent. of the total	28
Lumber, softwood, used in auto industry	349,000,000 board feet
Upholstery cloth used	47,000,000 yards
Top and side curtain material	18,600,000 yards
Paint and lacquer	15,270,000 gallons
Hair and padding	45,000,000 pounds

Another business which has been favorably affected by the motor-car growth is the insurance group. Automobile insurance premiums in 1927 amounted to \$490,972,536 and losses paid in the same year totalled \$241,249,417.⁵⁰

This amount of premiums is due to grow tremendously because while these figures were being compiled many states were debating the policy of compulsory automobile insurance and such a bill was recently passed in Massachusetts. The huge amount paid in losses is interesting.

All of these industries have been favorably aided by automobile growth. There is another side of the story and it tells of many industries adversely affected by such a growth.

The motors on our streets have almost eliminated the horse-drawn vehicles. Industries which raised horses, others which fed the animals, blacksmiths who shod them, stables

which housed them, harness makers who equipped them, and manufacturers of wagons have all felt the growth unfortunately. Many people engaged in these industries have become identified with the automobile industry.

The favorable effects far outnumber the unfavorable ones and economic progress requires the adjustment to the new order.

In this chapter we are witnesses to the effect the automobile has had on many industries. Since it has made them prosperous in varying degrees, it has added that much more to the general American prosperity.

CHAPTER VI

EFFECT OF THE AUTOMOBILE ON AGRICULTURE.

No industry has used the automobile to greater advantage than has agriculture. The farmer has used the tractor to supplant horses, the motor truck to market his produce, and the pleasure car to improve the social aspect of farm life.

The following table shows the decrease of horses and mules on American farms.

Number of Horses and Mules on Farms:¹

<u>Year</u>	<u>Horses</u>	<u>Mules</u>	<u>Total</u>
1910	19,833,000	4,210,000	24,043,000
1915	21,195,000	4,479,000	25,674,000
1920	19,848,000	5,475,000	25,323,000
1925	16,489,000	5,725,000	22,214,000
1929	14,029,000	5,447,000	19,476,000

The decrease from 1915 in horses has been over 7,000,000, while during the same time the number of mules has increased.

These horses have been replaced by tractors and automobiles. The number of tractors on farms in this country has increased from 80,100 in 1918 to 852,989 in 1929.²

An interesting incident of the tractor's replacement of the horse is told in the following quotation:

"In Montana a tract of ninety-five thousand acres is under cultivation with not a horse on the place, nor a mule. Instead, there are one hundred and nine tractors, which can

1. P. C., Recent Economic Changes, Vol. 2, p. 558

2. Ibid, p. 559

plow a thousand broad acres a day."³

Besides using tractors extensively, the farmer is the greatest buyer of pleasure cars and trucks. In 1928 he bought 4,729,600 of the former and 697,300 of the latter, making a total of 5,426,900.⁴

The truck has been invaluable to the farmer for marketing. Data from seventeen markets, in 1928, reveal that 1,000,000 truckloads of livestock went to market by truck. The mileage traveled reached the figure 50,000,000. The length of haul was from 1 to 300 miles, the average haul being 50 miles. The number of cattle hauled in this manner was 12,193,058 heads.⁵

Livestock is only one item of farm products and it is to be regretted that further figures are not available. Some idea of other uses of the truck may be had from the following statements.

Dairies make use of trucks to deliver 75 per cent. of the milk to the railroad stations from the farm.⁶

"Connecticut estimates that 90 per cent. of all farm products are being delivered by truck, and California reports 75 per cent."⁷

The truck, because of its speed, enables the farmer to go to market and return in a much shorter time than he for-

3. Bent, Machine Made Man, p. 91

4. N.A.C.C., Facts and Figures of the Automobile Industry, 1929, p. 72

5. Ibid, p. 54

6. Annals of the American Academy of Political and Social Science, November 1924, p. 15

7. Ibid, p. 16

merly went with a horse-drawn vehicle. He can also haul larger loads than before. The farmer is now able to transport his perishable crops to market in a fresh condition.

The truck and the horse may both be used on the same farm. The truck may be used for marketing purposes and by careful management the horses may be employed usefully on other farm jobs. The truck keeps the farmer in closer touch with the market relative to supply and demand, and also prices.

The large number of pleasure cars on the farms has brightened the social side of farm life. This social benefit of the automobile is also fundamentally an economic benefit.

In former years one of the greatest problems of all intelligent people was the steady drifting from farm to city with the resultant expectation that if the shifting of farm population continued, we should all starve from scarcity of food production.

The auto and the radio have done much to alleviate the disagreeable conditions of farm life. It is now possible to start the car, to visit the city for shopping or amusement, and to return in the same day.

In 1928 over 1,960,000 persons left the farms for the cities. In that same year a reverse movement took 1,362,000 from the city to the farm, resulting in a net loss

to the farm of 600,000. A larger birth rate than death rate on the farm reduced this number to a corrected net loss of 188,000 according to the Department of Agriculture's figures.

When it is remembered that the productivity of the individual farmer increased 15 per cent., that total production increased 50 per cent. faster than population, and that the average yield per acre has increased, we realize that the present drifting from the farm is a less serious problem than in former years.⁸

Henry Ford has predicted that eventually we shall have the farmers living in thickly-populated towns. He believes that they will motor in the morning to their work and at night return to their homes in the town.⁹

Many people do not agree that the introduction of farm machinery has been an unmixed blessing.

One writer has pointed out that the decrease in horses has been responsible for a land surplus of 50,000,000 acres. After a reasonable calculation he figures that a horse, according to the United States Army's rations, eats 70 bushels of grain and 2.5 tons of hay every year. He estimates that it will take five acres to raise enough food for a horse. Multiplying this by 10,000,000 (our loss of horses in twenty years) he arrives at fifty million acres.

8. Bent, Machine Made Man, p. 92

9. Automobile Trade Journal, December 1, 1924, p. 291

This writer proceeds to prove that this surplus land cannot be fully used to raise food for mankind until such a time as our population increases by fifty millions. Because so many farmers are ignoring this fact and are over-producing, is the reason for the present farm unrest now so prevalent in the country.¹⁰

His argument is one of the most logical explanations of farm overproduction that has been presented. Yet it is inconceivable that the farmers will ever relinquish their labor-saving devices. Solution of the farm problem must come from some other plan. That steps are being taken to solve this problem has been manifested by the calling of a special session of Congress to study the agricultural problem.

The following is Mr. Ford's statement: "The great fact about the automobile is that it is the most important step of production."

In 1929 there were in the United States 12,001 dealers of automobiles. The total production in 1929 of 4,345,700 cars, dealers' value amounted to \$1,214,000 in the same year. The value in the Ford alone was \$1,100,000 or 9.75 per cent. of the aggregate produced in this country.

The next four dealers and their respective percentages were as follows:

10. Nation's Business, November 1929, pp. 215 ff.

California - 4.25, and Michigan - 3.50.

1. N.A.A.C.P., Study and Report, 1929, p. 2.

2. Automotive Press Journal and Motor Age, May 1, 1929, p. 61.

CHAPTER VII

EFFECT OF THE AUTOMOBILE ON MARKETING METHODS

The growth in the number of automobiles has caused many marketing problems in both the automobile industry and in others which are wholly unrelated to the motor-car business.

Almost every car is marketed through a dealer. Every manufacturer has his own dealers and these agents represent the company in the sale of a car. These men may make suggestions to the manufacturers but most of the marketing problems of the industry are originated and solved at the factories.

That the factories deal harshly at times with the dealers has been already told in the chapter on Ford's position in the industry. Mr. Ford feels that the agent does nothing to produce the car and that the marketing of it is the easiest step of production.

In 1928 there were in the United States 53,091 dealers of automobiles.¹ Of a total production in 1928 of 4,358,759 cars, dealers' sales numbered 4,012,000 in the same year. The sales in New York State led all others with 351,000 or 8.76 per cent. of the aggregate produced in this country. The next four States and their respective percentages are as follows: Pennsylvania - 6.93 per cent., Ohio - 6.75., California - 6.59, and Michigan - 6.56.²

1. N.A.C.C., Facts and Figures, 1929, p. 3

2. Automotive Trade Journal and Motor Age, May 1, 1929, p. 61

Selecting satisfactory dealers who will represent the company in a manner that will create friendly feeling toward the manufacturer is a problem of the first magnitude to every producer. These dealers must also be located geographically on the best sites in order to insure the maximum number of sales. Supervision of the larger agencies by the manufacturers is not an uncommon arrangement. The financing of the cars, a vital factor in marketing, will be considered fully in Chapter X, "The Effect of the Automobile on Banks".

When satisfactory dealers have been engaged, the manufacturer can concentrate on the marketing problems of his product. Dealer sales will reflect the adequacy or inadequacy of the maker's conformity to the desires of the buyer. In such a highly competitive industry, one small omission or one small feature added to the car may determine the unpopularity or popularity of the company's products. For this important reason, large research laboratories are maintained by the larger companies. It is a case of the survival of the fittest.

One of the most important considerations in marketing is confidence in the product offered for sale. Marketing organizations realized that if the automobile was to increase in numbers it had to be mechanically perfect. The earliest tri-cycled cars were supplanted by the four-wheeled cars. The mechanical details were perfected so that the car performed creditably. The operation of the car was simplified so that any intelligent

person could master the simple details of operation. The smooth-running motor-car of today is the result of much research and this research was stimulated by marketing officials who were cognizant of the public's needs. That research employees have not reached the limit of perfection has been intimated by those in the industry. These men claim that improvements, insuring the reduction of gasoline used in an automobile, have been made and that these improvements will be introduced whenever a shortage of gasoline increases its price and makes conservation necessary by the use of higher-priced gas conserving engines.

The importance of the perfection of mechanical details was illustrated by Ford in the production of his new Model A. Hundreds of thousands of these cars were returned to the factories, at Ford's expense, in order to correct faults in the brakes and radiators. One of the principles of marketing insists on a satisfied customer.

Another marketing problem which officials encountered and settled was the change in body types of cars. In 1915, when the automobiles were beginning to appear in large numbers, the open car was the prevailing type. In that year no less than 99 per cent. of the cars produced were open cars. In 1928, conditions had changed completely, as only 11.5 per cent. of the cars produced were of the open-car type while 88.5 per cent. were closed cars.³

3. N.A.C.C., Facts and Figures, 1929, p. 3

The production of cars in 1928 by body types was as follows:⁴

<u>Open Cars</u>		<u>Closed Cars</u>	
Roadster	219,050	Coupe	778,802
Touring	226,977	2-door sedans	1,049,226
Chassis	14,101	All other closed	1,613,474
		Chassis	122,960
Total Open	<u>460,128</u>	Total Closed	<u>3,564,462</u>
Per cent. open	11.5	Per cent. closed	88.5

It was necessary that those in charge of marketing be acquainted with this change in demand or they would have found a large supply of unsalable cars in their inventories of finished goods.

The style of car, especially with reference to color, is another marketing problem. It has been frequently stated that since the advent of women drivers, the style has improved. Cars today may be had in almost any color.

Henry Ford jokingly said at one time that buyers of Fords could have any color provided that it was black. This statement was made at a time when he had the power to dictate style features but Ford in his new car has recognized the prevailing trend and has made his cars of many colors.

The old cars were large, massive objects. The new cars are low and compact making it easy to handle them in traffic congestion.

At other times, in recent marketing methods, new styles have been tried. Some succeeded such as balloon tires, non-shatterable glass, and aluminum trimmings, but others have

4. Ibid, p. 3.

failed such as the attempt to introduce disc wheels.

Mechanical standardization and perfection resulted in mass production and this increased output has enabled marketing expenditures of huge amounts which when spread over a large number of units of production do not seem too extravagant.

Advertising has played a tremendous part in the growth of the automobile, and, conversely, the automobile has been the greatest customer of advertising.

The motor-car has used every means known to advertisers to sell the product: newspapers, billboards, magazines, radio, electric-light signs, street cars, theatre programs and others. The advertising bill in 1927 was \$60,000,000, or about one per cent. of the retail value of automobiles, parts and accessories manufactured in 1927.⁵ The amount of money spent in newspaper advertising alone in 1927 by automobiles has been compiled from daily newspapers in 49 cities. Of the total amount of yearly advertising in these periodicals, the automobile was responsible for 19.3 per cent. and automobile accessories, parts and supplies contributed 5.7 per cent., a total of 25 per cent. of all newspaper advertising.⁶

The proof that advertising pays was illustrated in 1927 when Ford brought forth his new car. There was a great curiosity about the unknown car and there were advance orders

5. Presbrey, The History And Development of Advertising, pp. 564 ff.

6. P. C., Recent Economic Changes, Vol. I, p. 414

from 80,000 people who had faith in Ford and his engineers. But after Ford had spent \$1,500,000 for five days on the greatest newspaper advertising campaign which had ever been held, over 800,000 orders were received.⁷ Distributed over this large number of cars, the advertising spent for each car was less than two dollars, a cheap and efficient way of making sales.

The great benefit that the large amount of automobile advertising has conferred upon the advertising business was the experience it gave to a new business. The automobile trade was the first large group to advertise extensively. The experiences received from these great expenditures have been of incalculable benefit to advertising and the same methods have been applied to other industries such as the vacuum cleaner, washing machine, radio, oil burner, and artificial refrigeration.

The marketing division of the industry must be alert to world markets. It must be prepared to co-operate with the planning departments to meet such an emergency as the recent November, 1929 stock market collapse. Such a catastrophe necessitates the reorganization of marketing plans.

This division must also co-operate with the cost departments in deciding policies of cost reduction. The establishment of assembly plants in different sections of the country

7. Presbrey, The History and Development of Advertising, pp. 564 ff.

is an outgrowth of this co-operation. It was found that costs could be reduced by establishing factories in thickly-populated centers. Parts were then shipped by carload lots and assembled in these plants which were chosen for their nearness to the consumer market. The savings in freight were tremendous as thousands of parts could be shipped in the space formerly occupied by one car.

Automobile marketing divisions must watch competitive activities closely. A new outlet for the sale of machines may mean greater success for a company. Experiments have been made with the idea of marketing automobiles from department store agencies. This has been tried in Boston but has been virtually discontinued. This plan of marketing was another recognition of the woman's part in buying machines. The failure to get men into such stores has resulted in the discontinuance of these agencies.

An interesting experiment is going to be made soon in selling a cheap car through the mail order houses. "It is purposed to build a car which will sell for \$200. It will be sold through a mail-order house and delivered in a packing box container which can then be used as a garage."⁸

The Sears, Roebuck Company has been approached by a manufacturer who has offered them the agency for distribution of such cars.⁹ Nothing has been definitely decided as yet on

8. Nation's Business, September 1929, p. 11

9. Ibid, p. 146

this proposition but such a marketing policy would be revolutionary. The effect on present producers cannot be estimated and the most serious loss would be in the present low-priced field.

The Auto Shows have been one of the marketing methods used to advertise new cars. From a humble beginning in a New York barn, these shows have grown to large annual affairs held usually in the largest halls obtainable. Here the newest models of cars appear and salesmen explain their new features to interested spectators. Thousands of sales are made at these shows to people who have paid an admittance fee to see the new cars.

That the automobile industry is about to break away from its traditional policy of selling automobiles exclusively is the only conclusion that can be reached from many recent announcements.

General Motors Corporation announced at the St. Louis air show that it is about to market airplanes on an installment payment basis.¹⁰

An announcement made before this one indicates that General Motors is seriously planning also the sale of radios through its automobile salesrooms. That it has gone thoroughly into the plan is apparent from a summary of its findings.¹¹

10. Nation's Business, April 1930, p. 18

11. Nation's Business, October 1929, p. 14

The report lists some of the following advantages of using the salesrooms for the sale of these two products.

The articles, automobiles and radios, are not competing lines. They would in no way reduce the sales of each other.

The instalment plan of selling is common to the both items. Most radios are sold on time payment plans and 58 per cent. of new cars are sold on time.¹²

Such a combination would keep the showrooms employed advantageously the whole year. The seasonal sales of the two do not conflict as automobile sales are greatest in the spring and summer, whereas, radio sales are greatest in the fall and winter. Such all-year-around use of the showrooms and employees would be economically desirable and lower prices could be passed along to consumers by such overhead savings.

There are some disadvantages to this plan, however. Automobiles are sold by personal canvass while radios are bought by people who shop around.

The great problem here is to educate salesmen who understand automobiles in the mechanics of the radio. After this has been accomplished, the next problem is to get the interested customer to the showrooms. This may necessitate a re-location of present automobile dealers' stores.

The marketing possibilities of such a plan are tremen-

12. N.A.C.C., Facts and Figures, 1929, p. 32

dous and with such a strongly financed and well managed Company as the General Motors, the experiment should be successful.

That General Motors is not the only automobile company that is considering the marketing of airplanes is a well established fact. The Ford Motor Company's tri-motor planes are increasing in large numbers.

A news item in "Nation's Business", of September, 1929, reports that automobile dealers are seriously considering the profits which may be possible in selling airplane accessories and in equipping their shops to overhaul and recondition airplane motors - a job that must be done often if a plane is used frequently for long flights.¹³

The Ford Motor Company has gone into the marketing of food. Commissaries were established in Detroit and food was sold at a small profit to the Ford employees. This incurred the enmity of small food dealers but this ill-feeling was increased when large numbers of persons who were not employed by Ford, borrowed the Ford employees' cards and then traded at the Commissaries. There was a gradual tightening of rules and now the stores are patronized by Ford employees only.

That Ford has made a success of this venture is testified by the fact that sales in 1926 were over \$12,000,000 and profits were approximately \$400,000. Other stores were

13. Nation's Business, September 1929, p. 146

started in 1927 and undoubtedly sales and profits have increased.¹⁴

We have been considering, up to this point, the effect on marketing conditions within the automobile industry but the growth of this industry has caused many changes in unrelated industries.

In the chapter on agriculture we have noted the effects on the marketing of farm products. Milk is carried to the depots by trucks, produce is sent to the markets in the same way, and perishable food is assured of a quick delivery and sale. The saving of the farmers' wages and time because of speedy transportation is an important factor.

The marketing of horses, horse-feed, harnesses, wagons, blacksmith supplies, and stable-building supplies have been seriously affected by the decrease in the number of horses.

The mail-order houses were among the first to realize that their profits were seriously threatened by the automobile. The business of these houses was done mostly by catalogues and the farmers were the mainstay of the industry due to the ease with which farmers in their isolated positions found themselves able to order by mail.

Conditions changed and with the speedy transportation offered by the automobile they were no longer content with clothes which did not exactly satisfy. Time could be taken

14. Harvard Business Review, April 1928, pp. 313 ff.

to make a speedy trip to the city to inspect purchases before buying.

These mail-order houses did not waste any time. They studied the problem and decided to move into the city and to retain the business which was formerly theirs by mail. One outstanding characteristic of their stores is that they are situated on the outskirts of the city with free and ample parking space for the customers, a recognition of the importance of the auto in shopping.

These stores have multiplied rapidly. Montgomery-Ward began opening these stores in 1926. They located in towns of 3,000 to 6,000 population. In December, 1928, they had 230 small stores and in the large cities they had 18 department stores. They planned, at that time, a chain of 1500 stores.

Sears, Roebuck and Company, began these stores before Montgomery-Ward. In 1925, they started retail selling from their Chicago warehouse. Stores were opened in other cities and in December, 1928 the number of stores amounted to 37 large department stores and 155 smaller stores. Incidentally, it may be mentioned that Sears-Roebuck and Company's marketing of tires has been responsible for a major portion of its "department-store" sales.¹⁵

Other department stores recognize the problem of shopping

by automobile and are making efforts to settle them. They are trying to overcome the advantage enjoyed by department stores on the city's outskirts. In Boston, the Jordan, Marsh Company has erected a garage where shoppers may park their cars free of charge, while shopping at Jordan's store.

Some department stores own a bus which takes the customer from the company's garage to the company's store. The garage and the bus service are both gratis. Other stores have gone as far as employing chauffeurs to meet the customers at the company door, to drive the cars to the company garage and later, when the customer is ready another chauffeur drives the car from the garage to the store where the customer is waiting.

Large department stores have found it advisable to establish branch stores in communities which have grown because of the speed with which they may be reached from the cities.

Chain grocery stores selling convenience goods have had an enormous suburban growth due to the settlement of these towns because of the ease of commuting by automobile. These chain stores have supplanted the old general store. The new chain stores are in reality general stores, as they now handle almost every conceivable product, but they are units in a chain which employs the most efficient methods and which has tremendous wealth behind it.

The chains can sell at much cheaper rates than the privately owned small store, because of the benefits of vertical and horizontal combinations. Some of these chains own many

factories which produce their own branded products. When this is not the case, the chains gain the same advantage by large quantity purchases which effect the same result as an integrated policy.

The loss in trade of the small stores and general stores is directly responsible for the loss in wholesalers' business. Small stores lose their trade to the chains, and the wholesaler, who sold to these small stores, loses sales. The chains do not trade with the wholesalers but because of their huge purchases trade directly with the manufacturer. Thus, the trade lost by the small store is also lost by the wholesaler.

The wholesaler loses again by the small inventories carried by the stores. Nearness to the market, and rapid transportation, are reasons for small inventories and "hand-to-mouth buying".

Business firms were quick to see the marketing advantages of trucks. Sales increased with the promise of speedy deliveries. Many more deliveries each day could be made by the auto truck than formerly and the savings were reflected in cheaper prices. The original expenditures for auto trucks were greater than for wagons, but the larger number of items and the heavier loads carried, when distributed over the larger number, resulted in a cheaper delivery expense than by the former methods.

CHAPTER VIII

EFFECT OF THE AUTOMOBILE ON REAL ESTATE

The greatest effect of the motor-car on real estate has been the gradual development of the suburbs and the resulting decentralization of the cities.

The ease with which an automobile owner may go from his work in the city to his home in the suburbs has caused the growth of our outlying sections. The desire to get away from the noise and the heat of the city has been fulfilled by the use of the automobile which permits the satisfaction of this desire and at the same time furnishes rapid transportation to a place of business in the city.

The migration to the country has been responsible for a great change in many sections. Every large city has witnessed the rapid growth of its suburbs and the situation is identical everywhere.

Boston is a typical example of any such city. It has a population of nearly 800,000 but if its surrounding cities and towns were annexed, it would have a population of over 2,000,000. Most of the wage-earners in these districts are employed in Boston and a large number enter and leave the city by means of their automobiles.

Boston has been a witness to the growth in the last twenty years of all these cities and towns. We have only to compare the population of these cities in 1910 and in 1930 to realize

what a change has taken place.

The Newtons, Arlington, Wellesley, Milton, the Quincys, Winthrop, Lynn, Beverly, Weston and hundreds of other small cities and towns show this tremendous growth.

Auburndale, Massachusetts is an ideal illustration of this change. In 1910, it had a population of 2400 and many large farms were to be found there.¹ The time, used in making the trip from Boston, was considerably more than one hour and closer to one hour and one-half. Some of this delay was due to car service but car service is an important item to working people.

With the introduction of the automobile, the town became an ideal settlement for suburban homes. Very few large farms are found there today and their places are taken by homes and stores. The town is about a twenty minute automobile ride from Boston over ideal roads. In 1920 the population was 4,070 an increase of 70 per cent.² If this increase is sustained, the population in 1930 should approximate 7,000 or triple the number of 1910. With the increased population better electric car and steam-train service has been added also.

The automobile would not be of much importance without good roads. The establishment of these good roads follows

1. Heiltrin, Pronouncing Gazeteer of the World, p. 129

2. Rand-McNally, World Atlas, 1929, p. 217

as a consequence the settlement of any territory and than the establishment of these good roads further increases the population of the town.

We have, in Chapter IV on "The Effect of the Automobile on American Roads", given the testimony of Westchester County, New York, to the fact that an expenditure of \$8,750,000 resulted in increased property values of \$500,000,000. Every other community has had the same experience and the result has been increased taxes. It is safe to conclude then that expenditures for good roads are a paying investment and not an expense.

In order to live a great distance from the city it is necessary nowadays to own an automobile. A small town will most likely be a long distance from a city and the ownership of cars for a thousand people there will be greater than for a similar number in the city where the electric cars and electric and steam trains supply the services.

The following statistics substantiate this statement. It is found that 55.6 per cent. of pleasure cars are in towns with population under 10,000 and that 49.1 per cent. of auto trucks are in the same neighborhoods. The large percentage of trucks in the small towns is due undoubtedly to their use in marketing farm produce.

<u>Population of Towns and Cities</u>	<u>Per Cent.</u>	
	<u>Cars</u>	<u>Trucks</u>
Towns under 1,000 inc. rural population	23.1	24.0
1000 to 2,500	11.3	9.7
2,000 to 5,000	8.3	7.9
5,000 to 10,000	7.9	7.5
10,000 to 25,000	8.9	8.9
25,000 to 50,000	6.4	6.6
50,000 to 100,000	6.0	6.3
100,000 to 500,000	11.7	14.1
500,000 and over	11.4	14.5
	<u>100.</u>	<u>100.</u>

The ownership of such a large number of motor cars entails a problem of housing all of them. In the suburbs nearly every home has its additional building to house the family car. Real estate dealers have provided garages to go with every new house in the suburbs and these garages are generally of the same material as the houses.

Many of the new houses that are being erected have garages under the houses. Thus the very style of architecture has been changed by the automobile.

The millions of dollars expended to build these garages have resulted in employment to thousands of builders, carpenters, painters, and other thousands engaged in garage supplies' work.

Millions have been spent in building large and small urban garages and employment and profits have been given to hundreds of thousands of people.

Gasoline filling and service stations have also helped to develop real estate. In the cities there are, of course, thousands of such stations. On one Boston street, Columbus Avenue, between Roxbury Crossing and Northampton Street, there are ten such stations in a distance of one mile. In addition there are eight stations in the same district on Tremont Street, a street running parallel with Columbus Avenue and, at some parts, only about two hundred yards distance from it.

These stations, in most cases, have erected neat buildings, sometimes going to excess and building unnecessarily elaborate

structures.

Some interesting statistics tell of the contracts for motor buildings in 1928:³

<u>Types of Building</u>	<u>No. projects</u>	<u>New floor space</u>	<u>Valuation</u>
Automobile Sales } Rooms }	7,569	42,212,000 sq. ft.	\$149,136,700
Service Stations }			
Public Garages }			
Vehicle Mfg. Plants	291	9,653,800 sq. ft.	37,994,800

3. N.A.C.C., Facts and Figures of the Automobile Industry, 1929, p. 12

CHAPTER IX

EFFECT OF THE AUTOMOBILE ON DETROIT.

The growth of the City of Detroit is interesting because it is the most important city of the automobile industry.

The population has grown tremendously as the following figures indicate:

<u>YEAR</u>	<u>POPULATION</u>
1850	21,000 ¹
1880	116,340
1890	205,876
1900	285,704
1910	465,766
1925	1,242,000 ²

From these figures it can be seen that the population has tripled in the period 1910 to 1925. This period marked the greatest growth of the automobile industry.

While the automobile has unquestionably increased the population and prosperity of Detroit, the city was well on its way to prosperity without the automobile.

In the State of Michigan there were iron and copper mines and large forests. These assets resulted in the growth of wood and metal-working industries. Some of the early manufactures of Michigan were the following: stoves, brass, ships, carriages, and wagons.

In 1880 the government census credited Detroit with a

1. Catlin, Story of Detroit, p. 460
2. World's Work, October 1926, p. 619

production of manufactures valued at \$26,761,532. The capital invested in manufactures was \$13,224,373. Employees numbered 17,607 and wages paid were \$5,154,744. Some of the products were the following:³

<u>Product</u>	<u>Output</u>
Railway cars	\$1,448,756
Clothing	1,762,502
Seeds	1,194,066
Chewing tobacco	1,211,146
Cigars	1,200,000
Meat-packing products	1,789,731
Flour	1,663,367
Boots and shoes	1,108,225
Engines and boilers	964,655

The last item is particularly interesting as it informs us that as early as this period large numbers of gasoline and steam engines were manufactured for stationary power uses. This was an incentive to mechanically-inclined inventors to produce automobiles.

From these statistics it is apparent at once that in 1880 Detroit was a city of diversified industries.

When the automobile was invented, Detroit offered every manufacturing advantage. It had the materials, labor, inventive genius, and the capital. While we recall that Ford had a very difficult time financing the third company, the Ford Motor Company, no mention is made that there was any difficulty in raising financial aid for the first two companies.

Investors were courageous in those early days when auto-

mobile performance was new and was subjected to much ridicule. To its faith in the industry and those engaged in it Detroit owes its present great prosperity. Because the Detroit manufacturers were so successful, due to their own initiative and the economic advantages of Detroit, the center of the automobile industry has never moved from this section. Detroit never relinquished the advantage she gained by what economics calls the momentum of an early start.

One great economic benefit to the industry was the large number of independent companies manufacturing many different products. The laborers were intelligent and were well acquainted with machine technique. In those early days it required brains and care to operate machinery as these did not possess the perfection or the safety devices of today.

The willingness with which these manufacturers changed from the production of their own lines to the manufacture of automobile parts and the efficiency with which they mastered the new product were of the greatest benefit to automobile manufacturers.

Ransom E. Olds was the first man to establish an automobile factory in Detroit and from his plant a dozen other men went out to start their own manufacturing plants.⁴

Mr. Roy D. Chapin, an influential figure in the automobile industry, makes the following comment on Detroit's auto-

4. Duncan, World on Wheels, p. 932

mobile history.

"Three men, Henry Ford, Ransom E. Olds, and Charles King were responsible for the origin and development of Detroit and the surrounding territory as the center of the automobile industry. The cars they made and the companies they established were successful, while many of those made in other cities were not. The Detroit successes stimulated local effort and attracted others from other industries."⁵

David Buick and Henry Leland are other early manufacturers not mentioned by Mr. Chapin.

Detroit was not the only city which gave its attention to the automobile. Experiments in automobile manufacturing were being made all over the country but the mortality of such companies was tremendous. Detroit had the advantages and Ford, Olds, Buick, Cadillac, (Ford's first company), and Packard were producing a large number of cars in 1907.

Even today Detroit has many diversified industries. We know that it is the largest manufacturer of freight cars, pharmaceutical preparations, varnish, soda ash and similar alkaline products.⁶ It is also a very important meat-packing center. From a comparison with the census figures of 1880, previously mentioned in this chapter, it will be recognized that Detroit has also prospered because of the early start it got in these industries.

5. Seltzer, A Financial History of the American Automobile Industry, pp. 29-30

6. Encyclopedia Britannica, 11th Edition, p. 115

Yet the fact remains that Detroit is becoming too dependent upon the automobile. In December, 1925 there were 247,000 on the payrolls of Detroit auto companies.⁷ The 1930 census figures will be very interesting as regards the number employed in this city. From 1925 to 1930 was the period that the automobile grew to be the most important American industry financially. During this time, however, new machinery has constantly been developed which has reduced the number of men required. It remains for the latest figures to prove whether or not the industry has reached the maximum number of men that it will employ.

A proof that the city is too dependent upon the motor-car industry was shown when Ford changed to Model A. Mr. Ford had hoped that it would not be necessary to close his plant entirely but eventually he had to do so. In his factory 60,000 men were "laid off" for an indefinite period. "The loss of their wages and their purchasing power affected adversely 500,000 others in Detroit. Banks were hurt, instalment companies suspended, landlords were busy with evictions, the charity budget went up \$600,000. Many of these men are now back after a year of idleness."⁸

When we remember that the Ford model change left 60,000 unemployed and affected 500,000 people, the consideration is

7. Duncan, World on Wheels, p. 1005

8. Chase, Men and Machines, p. 213

unpleasant when we think of what would occur if anything should happen to transfer the auto industry from Detroit to some other city. Our own Massachusetts mill cities have learned to their sorrow that a one-industry city or town may come to rue the day that it did not continue its diversification.

Too large a percentage of the total population of Detroit, 1,242,000, is employed in the automobile industry. If we eliminate from this total the number of those unemployed such as mothers, children, aged people and invalids, and then compare the balance to the number directly employed in the Detroit auto industry in 1925, 247,000, and if we also consider the other industries which depend on this huge automobile-employed number for their success, Detroit's position is clear.

If further improvements are to be made in automobiles, and there is no evidence that such will not be the case, then there is a great deal of uncertainty about this particular factory work. Wages do not seem to be as satisfactory in the light of this new development especially when these wages must be spread over a year of unemployment. Much has been written by sociologists on this subject and only a beginning has been made. The outstanding fact is the tremendous amount of power in the hands of one individual who can affect adversely in a short time over 500,000 people. The thought that such a power may be abused is one which warrants serious consideration. Happily, no such abuse has marred past relations.

That concentration on one industry, which happens to be the leading American one, has its rewards is evident from the material prosperity which Detroit enjoys and which benefits we now enumerate.⁹

Of the total number of homes in Detroit in 1926, occupants owned 60 per cent. of them. This is an admirable condition of civic pride. A citizen cannot better express his faith and confidence in the future of his city than by purchasing a home and settling in it. Without wishing to inject an unduly pessimistic note, it is well to remind the writer, Mr. Strother, that many New England mill towns, Lowell in particular, still have a very high percentage of home owners, but their one chief industry, the cotton or wool, has gone South.

The Ford unemployment in 1926-27 may have forced many people to sell their homes but it is reasonable to assume that these were again purchased when steady work was given on the new model.

This same writer in the World's Work says that there are no tenements in Detroit. This is another admirable asset for a city population. Pride of ownership should insure pride in the upkeep of these homes.

We are told in this same article that there is no capital and labor problem in the city of Detroit. This is corroborated

9. World's Work, What Kind of a Pittsburgh is Detroit, October 1926, pp. 632 ff.

by Ford's many public utterances that he has never had a strike in his factory. This is due undoubtedly to the high wages paid in the industry. It may be also due to the concentration of the city on one industry. Labor, although more mobile than formerly because of the automobile, dislikes to move from its established social surroundings. However, a strikeless city is one to be admired and the other industries might well study the automobile industry's employer and employee relationship.

Strother maintains that wages are high and hours of labor are short in Detroit.

This is true but as we have previously stated the uncertainty of mechanical changes warrants high wages to tide the employees over the shutdown period. Detroit automobile industries have been among the first American business concerns to adopt the five-day working week. Whether or not this is an economic advantage has not been decided as yet and it is at present the subject of many interesting economic debates.

"Detroit schools are a boast of American educators."¹⁰

That Detroit is advancing culturally is manifest by a reading of the history of the City. This is a natural and praiseworthy achievement. An intelligent individual who achieves wealth realizes that culture is a very important correlative. Conditions are the same with the city as with the individual. Detroit is awake to its opportunities.

10. Ibid, p. 634

CHAPTER X

EFFECT OF THE AUTOMOBILE ON BANKS

The banks have experienced many direct and indirect effects from growth of the automobile industry.

The motor-car has caused the establishment of many town banks. We have already considered the development of real estate in cities and towns by the ability of the automobile to reduce the time required to reach these hitherto inaccessible localities. As soon as a town reaches any considerable size it must have a bank. This need of merchants and people in the new communities has resulted in the establishment of individual-owned banks or branches of larger urban banking houses.

There has been a tremendous increase in bank savings all over the country and much of these savings has come from the earnings of the automobile industry. The high wages paid in the industry directly and indirectly to more than four millions of people must have resulted in some savings. The homes in Detroit which are 60% owned by the citizens of Detroit were not paid for in one cash sum. It must have taken years of thrift to accomplish such a feat. The major part of this money must have been saved in banks during its period of accumulation.

There must have been also an unfavorable effect of the automobile on the banks. The fact that in 1929 more than 26,000,000 cars were being operated in the United States proves conclusively that instead of saving money the people were in-

vesting in motor cars. The cost of upkeep must also take many dollars that would have found their way eventually to the bank.

The fact remains that after these huge expenditures have been paid out instead of saved, the increase in savings has continued. This indicates a prosperous condition of national affairs helped considerably by the growth of the automobile. This prosperity has been checked temporarily at the end of 1929 but this is a transitory condition.

The real effect that the bank has realized has been its relationship to the industry through the medium of finance companies.

Relations between the banks and the early industry were not very cordial. The bankers felt that the industry was a risk as the first automobiles were luxuries. They did not foresee the tremendous growth which was to come.

The automobile makers did see the growth and they realized that if they were to expand their operations and enjoy the economies of large-scale production that a method had to be conceived which would finance automobile sales to dealers and also to consumers.

It is now a well established production principle that the greater number of mass-produced-articles sold the greater will be the savings in manufacture to the point where the economic law of "diminishing returns" applies.

The development of these finance companies is interesting.

In the period before 1910 cash was paid for most automobiles.

In 1910 the Morris Banks lent money to purchasers of automobiles but the termination of this policy came at the end of the year because these Morris Banks decided the automobile was a luxury and too much of a credit risk. Mr. Morris resumed this practice in 1917 when he co-operated with the Studebaker Motor Car Company. He also served as president of the Industrial Acceptance Corporation which financed Studebaker dealers.¹

The first person who engaged in this financing business as a regular promoter was Mr. L. F. Weaver of San Francisco, in 1913. Bankers attempted to discourage him with talk of the automobile's being a "luxury risk" but he continued successfully in the business.²

The Willys-Overland Company in 1915 accepted the financing help of a Mr. Edward S. Maddock who was later succeeded by the Guaranty Securities Corporation of New York.³

At the 1916 automobile show an attempt was made to form one general finance company which would be owned and operated by all the automobile companies for their mutual advantage. The attempt was unsuccessful but the need of such companies, expressed by the makers at the show, resulted in the establishment by existing finance companies of subsidiary automobile finance companies.

1. Seligman, Economics of Instalment Selling, Vol. I, pp. 42 ff.

2. Ibid, Vol. I, p. 43

3. Ibid, Vol. I, p. 44

General Motors Corporation entered the finance field in 1919 with its subsidiary, General Motors Acceptance Corporation. This subsidiary is now the leading automobile finance company in the United States, if not in the world. With the advent and success of General Motors in this field, others entered the business. The period from 1921 to 1925 is called the "boom period" of automobile finance companies. In 1922 there were about 1,000 finance or credit companies which handled 17 per cent. of the automobile sales.⁴ In 1923 between 1600 and 1700 companies were helping to finance 58% of the new cars sold on time. Of interest is the reduction from 68.2 per cent. in 1925 to 58.1 in 1928 of automobiles sold on time payments.⁵

The General Motors Acceptance Corporation on December 31, 1928 had a capital, surplus, and undivided profits of over \$64,239,934. Their assets were over \$390,557,995 and they did a volume of financing of over \$937,066,735. This large amount consisted of 242,624 cars financed for wholesalers of \$388,676,355 and 1,221,306 cars financed for retailers for \$548,390,430.⁶

The great number of finance companies competing for business resorted to what is known in marketing as "cut-throat competition". An Association of Finance Companies was formed and an attempt was made to agree on certain fundamental prin-

4. Seligman, Economics of Instalment Selling, pp. 48 ff.

5. N.A.C.C., Facts and Figures, 1929, p. 32

6. Moody's Industrials, 1929, p. 1963

ciples. This Association in 1924 succeeded in getting its members to agree that the terms should be uniform. A down payment of 33 1/3 per cent. and the remainder in twelve monthly payments was the agreement for new cars.

A down payment of 40 per cent. and the instalments in twelve monthly payments was the rule for the sale of used cars. An allowance has been made in the case of a buyer who is not paid periodically. He can pay in three large payments if this is desirable. These rules are in practice in most parts of the country with the exception of the Pacific coast states.⁷

General Motors Acceptance Corporation is an independent company which limits its activities to General Motors Corporation dealers. The manufacturer does not insist that these dealers finance themselves through the Acceptance Corporation but the parent Company does insist that it shall not charge the purchaser of a car a higher finance charge than the purchaser would have paid if the car had been financed through General Motors Acceptance Corporation.

The methods of financing these automobile sales is interesting. The companies are all privately owned and are started by an issue of capital stock.

They receive the notes of the wholesalers or retailers. Most finance companies handle the wholesale trade and also the retail trade. If the company is financially strong enough

7. Seligman, Economics of Instalment Selling, Vol. I, p. 59

it does not have to borrow from the bank. This is not often the case and the usual procedure is for the finance company to borrow from the bank and to give as collateral the signed notes of the wholesaler or retailer. When the former or the latter pays his notes, the finance company pays its loan to the banker.

Another method of the finance company is to take the notes of its customer to the bank and to discount them. In this way the bank has two names as security. If the maker does not pay at maturity the banker can hold the indorser, the finance company.

The third method is for the finance company to give over to the bank the signed notes of its customers. The bank then acts as a trustee and using these notes as collateral, it issues its own notes against them and turns the money from the sale of its own notes over to the borrower, the finance company. This last method is the most common of the three.

It will be noted that in every one of the three methods the final carrying or financing of the automobile sales is borne by the bank. The bank has undoubtedly changed its attitude about the risk as the automobile is no longer a luxury but to millions it is a necessity.

The restrictions today, while adequate, are not nearly as severe as in the early industries. The finance companies are competing so strongly for the business that they are not nearly so strict in their requirements and they bear a great deal more

of the risk themselves. In the earlier days when the wholesaler was being financed, he and the manufacturer had to indorse notes. Now the wholesaler's note is sufficient. Previously when the retailer wanted to borrow it was necessary for the customer to sign and also to have the wholesaler sign.

The banks have entered the financing business directly. In order to assure themselves of a part in this growing business, many banks have formed their own financing companies.

Since the passage of the Federal Reserve Act the automobile notes and other acceptances are eligible for re-discount at the Federal Reserve Banks. Thus the bankers can pass this carrying proposition on to the larger group of bankers comprising the Federal Reserve System.

Professor Seligman in his voluminous work on instalment selling has compiled the opinion of bankers as to the causes of failures of automobile dealers. It is especially valuable in a work of the type of this thesis. Of the replies received, the following information is interesting.

Causes of Dealer Failures⁸

1. Too great allowance on used cars	50
2. Lack of capital	26
3. Mismanagement or lack of ability	23
4. Dishonesty	10
5. Lax credit extension	14
6. Credit terms	5
7. Special	
(a) Failure of manufacturer	1
(b) Excess overhead	2

The bankers who gave this above information state almost

8. Ibid, Vol. II, p. 422

unanimously they believe that the dealer situation has adjusted itself and that instead of being a dangerous credit risk they, the bankers, wish that it was possible to get more of these dealers' business.⁹

An answer to people who do not place much faith in the future of instalment selling is found in the figures obtained from General Motors dealers.

The cars of these dealers sold on the instalment plan amounted in 1922 to 43 per cent. of the total of these dealers' sales. In the following years instalment sales gained. In 1923 it was 49 per cent., in 1924 it was 54 per cent., in 1925 it was 57 per cent.

In 1922 the bank losses in financing these sales were 1.4 per cent. of the dealer borrowings. In 1923 the losses were .4 per cent., in 1924 they were .3 per cent. and in 1925 they were .2 per cent.¹⁰

These figures prove conclusively that an increase of instalment sales has resulted in a decrease of bank losses for financing them. The relatively large percentage in 1922 may perhaps be explained by remembering that 1920 and 1921 were depression years and that 1922 was in the recovery stage. Another explanation may be that there was an improvement in the granting of credit by the dealers and a general tightening up in requirements before such credit was granted.

9. Ibid, Vol. II, p. 424

10. Ibid

From this chapter it has been developed that the banker was not enthusiastic about the early automobile industry. That this attitude has been changed by the splendid achievements of the industry itself is also apparent.

While we are considering the relationship of the banks to this business it is of interest to recall Ford's independence of the banks. The Ford Motor Company had a difficult time financing the early company.

It has become well known that in its early development Ford was offered \$5,000,000 by the J. P. Morgan Company for his business. Ford agreed to sell but the Morgan interests withdrew their offer.

In 1923 the bankers felt sure that Ford was in need of cash and that they could dictate terms. While he did need the money, he raised it himself by converting his Liberty Bonds into cash. He also forced upon dealers orders which they did not want and for these orders he demanded a cash payment. Then began an economic retrenchment in the Ford plants. The storm was successfully weathered and Ford maintained his independence of the banks. He has never allowed his asset of cash to approximate this condition again, and his balance sheet, as presented earlier in this thesis, is noted for its large amount of liquid assets.

CHAPTER XI

EFFECT OF THE AUTOMOBILE ON THE RAILROAD.

The statement is frequently made that the automobile has seriously affected the revenues of the railroads. This is true but there are several angles of the situation which must be considered.

The automobile has decreased the number of passengers who previously had ridden in the trains. Many of these people drive their own machines or ride with friends. This is a definite loss of revenue to the railroad. The decrease has been a steady one. In 1924 the number of passengers carried by the railroads was 932,678,462;¹ in 1925 the number was 888,267,296,² in 1928 it was 790,327,447.³

But there have been some compensating features to offset this loss. As we have stated before, the automobile was responsible for developing the suburbs and distant towns which were inaccessible up to this time. These suburbs have necessitated increased train service for the greater number of passengers carried.

All car owners do not drive to work. In most cases only one member of the family can drive the automobile on the way to work, the others must take the car or the train. The expense of parking a car in a garage may be greater than the

1. I.C.C., 38th Annual Report of Railway Statistics, p. XXXIX
2. I.C.C., 39th Annual Report of Railway Statistics, p. XLVI
3. I.C.C., 42d Annual Report of Railway Statistics, p. XLVI

train fare, or, the traffic problem in the city may prevent street parking.

Many conclude that because there has been a decrease in railroad passengers that there should necessarily be a decrease also in passengers on electric street railways. Such is not the case.

Here we have some conflicting figures. In the 1928 publication of the National Automobile Chamber of Commerce, the following statistics are given:⁴

Buses Gain, Trolleys Lose Passengers

<u>Bus Passengers</u>		<u>Trolley Passengers</u>	
1927	266,079,948	1927	361,073,065
1926	<u>199,640,564</u>	1926	<u>397,690,308</u>
Increase	66,439,384	Decrease	36,617,243

Other statistics from a different source entirely contradict these figures. In the "Business Week" of March 12, 1930, the following item appears:⁵

"Street car riding is gaining rapidly in the large cities. Survey of 10 (New York, Chicago, Detroit, Cleveland, Baltimore, Boston, Pittsburgh, St. Louis, Milwaukee and San Francisco) shows 33% increase in the last 10 years in passengers carried by electric railway companies. Actual 1929 total, as compiled by the "Electric Railway Journal" is 6,500,000,000. Population in the same cities has increased only 16 per cent. Number of rides per inhabitant has grown from 330 to 375."

4. N.A.C.C.-Facts and Figures, 1928, p.41.
5. Business Week, March 12, 1930, p.40

In these two sets of figures there is a tremendous discrepancy. The Automobile Chamber's figures are not conclusive. It may be possible that the trolley cars' loss in passengers was not really a loss but a transfer of passengers from trolley cars to buses because these trolley companies may have bought buses to replace the electric cars over certain routes. Such a replacement has been found to be economically desirable.

The figures of the "Electric Railway Journal" are more likely to be accurate as this Journal could have no motive in misstating facts which surely would not be to its advantage. The definite statement is made that this total, 6,500,000,000, is the number of people carried in 1929, whereas, the automobile figures are attempting to prove that a change is being made from trolley cars to buses and their figures are not attempting to prove a loss in electric railway passengers.

The gain in electric railway passengers would have been increased even more but for the competition of the taxicab companies. An idea of how strong this competition has been is indicated from an estimate of the business done by taxicabs in New York in 1928. This report states that \$160,000,000 was spent for rides in these cabs, an amount greater than the revenues of all the New York subways, elevated systems, and surface systems there.⁶

While there may have been a decrease in railroad passengers because of the automobile there has been, on the other hand, an

6. Bent, Machine Made Man, p. 175

increase in freight due to the same cause.

It is a natural expectation that the leading American industry would be responsible for a tremendous amount of freight. That this expectation is realized can be noted from the following statistics:⁷

Automotive Freight on Railroads in 1928
Proportion to Total Carload Traffic Originated

Carload Freight of All Kinds 1928 (I.C.C. Statistics)	Of which Auto Mfg. and Use, and Highway Building Pro- duces:	
	<u>Carloads</u>	<u>Per Cent.</u>
Products of Forests and Mines		
16,935,840	929,350	5.5
Products of Manufactures and		
Miscellaneous 11,833,638	2,570,900	21.7
All others, including		
Agricultural and		
Animal Products 9,652,186		
Total carload		
traffic originated 33,421,664	3,500,750	9.1

There may have been a considerable decrease in railroad passengers but this increase of 3,500,750, or 9.1 per cent. of all the freight carried by the railroads, certainly is a compensation for the decrease of riders. The railroads of today are in the best condition that they have ever been and dividends are being paid today by roads which had not paid them for years and which were thought to be in a bankrupt condition. The Boston and Maine, in our own State of Massachusetts, is a typical example.

That a great measure of credit for the successful condition of the roads is due to the Transportation Act of 1920 is not to be denied, but this Act has had a worthy helper in its rehabilitation

7. N.A.C.C.-Facts and Figures, 1929, p. 10

activities when it had the automobile industry, a comparatively new one, to contribute over nine per cent. of the total annual freight.

An analysis of these 3,500,750 carloads has been made by the National Automobile Chamber of Commerce in certifying the Interstate Commerce Commission's statistics. The Chamber found it necessary to estimate partly some of the items but their figures agree, almost exactly, with those of the Commission. The Chamber's figures follow:⁸

Automotive Freight in 1928 Exceeds 3,500,000 Carloads

	1928 Freight Carloads
Motor vehicles, parts and tires	936,107
Gasoline	1,173,000
Iron and steel	180,000
Coal	70,000
Crude petroleum	54,400
Lubricating oil	50,000
Lumber	45,000
Crude rubber	16,450
Asphalt for roads	44,000
Cement for highways and bridges	171,300
Gravel, sand, and stone for roads	690,000
Miscellaneous such as non-ferrous metals, paints, upholstery materials, plate glass	70,000
Total	3,500,757

The greatest effect of the automobile on the railroads has been the adoption of the automobile bus as a supplement to existing railroad lines.

When the bus began to compete with the railroad, the latter decided to war upon the intruder. Legislatures were petitioned to prevent these buses from acting as common carriers.

The buses were successful in this controversy because it was recognized that they could render a beneficial economic service by quick transportation with more convenience to the rider.

The railroad then wisely decided to adapt the bus to railroad services. It was found to be more economical in many places than the operation of the trains.

The total number of buses in the United States in 1928 was 92,000.⁹ In the middle of 1929 the number had increased to more than 100,000 and sixty railroads owned 2,200 of them.¹⁰

Buses in this country covered over 800,000 miles of route in 1928. It was estimated that they would cover a total mileage of 1,750,000,000 and that they would carry 1,800,000,000 passengers. In long distance rides the bus fare amounted to 60 per cent. of the railroad fare.¹¹

In New England we have two large companies which use these buses extensively. The New England Transportation Company of Boston employed 271 buses to cover routes of 2150.70 miles. The Boston Elevated Railway Company used in the same year 303 buses to cover routes of 36.70 miles.¹²

The electric street railways have adapted the buses to their work and have found them very satisfactory. It has been suggested by many that a solution of part of our traffic problem would be to substitute buses for street cars. The bus

9. Ibid, p. 58

10. Bent, Machine Made Man, p. 177

11. Ibid, p. 178

12. N.A.C.C., 1929, p. 59

can drive to the curb and stop and the danger to passengers is eliminated and traffic can continue without waiting for passengers to alight in the middle of the street as under present conditions.

The railroads use not only buses for the passengers but also automobile trucks for the delivery of freight. Deliveries are speeded up greatly when the railroad-owned truck can deliver packages to the door of the consignee. That there is a widespread use of these trucks is evident from the fact that 70 railroads used these trucks in 1928.¹³

The Boston and Maine Railroad uses 171 motor trucks to carry all less-than-carload shipments. These trucks meet the trains at certain points, take the freight and deliver it quickly to its destination. The trucks also deliver freight to the trains for speedy transmittal. The Boston and Maine was a pioneer in this combination service and a saving of 24 to 48 hours has been made on deliveries. These deliveries are being made at 189 stations.¹⁴

With the success of this experiment assured it is a foregone conclusion that other railroads will develop this combination rail-highway service.

For city deliveries the truck has almost entirely supplanted the horse-drawn truck. Only those businesses, the

13. Ibid, p. 57

14. Ibid

canvassing nature of which requires a stop at every door, continue to use horse-drawn vehicles and these are gradually giving way to the truck. All other concerns find it necessary to use truck deliveries.

Of all the trucks in the United States 82 per cent. of them are privately owned.¹⁵

Of all the trucks produced here the majority are light trucks. The one-ton style and those which carry less than one and one-half tons accounted for 54.9 of the 1928 production.¹⁶

15. N.A.C.C., Facts and Figures, 1928, p. 35

16. N.A.C.C., Facts and Figures, 1929, p. 9

CHAPTER XII

EFFECT ON TRAFFIC AND CITY PLANNING

One of the serious problems which has resulted from the automobile's growth is the traffic congestion.

That such a condition was never anticipated is certain from a statement of Henry Ford in 1924. At that time in an interview he was quoted as having said, "Traffic problems will take care of themselves. It would be a good beginning if traffic rules and regulations were standardized."¹

That traffic will not solve its own problems is indicated by the huge outlay of money spent by states and cities in trying to provide adequate remedies. In the older cities the problem is especially annoying.

The reasons for traffic congestion are fundamentally the same in every city. Narrow streets, which were not built to accomodate the large number of present-day cars, are responsible for most of the trouble. Parking in busy thoroughfares is another source of congestion. Intersecting streets cause many delays and unless there is an efficient police corps to handle the traffic at these intersections these delays are of long duration. Then too the absence of a city, or better still a regional planning board, is accountable

1. Automobile Trade Journal, December 1, 1924, p. 291

for much of the congestion.

A recent survey of 233 cities in the United States was made with the hope that by listing the experiences of these cities and the remedies that they were applying, it might be possible to arrive at solutions of these traffic problems.

Out of a total of 233 cities, replies from 131 stated that their greatest problems were narrow streets and parking.²

Statistics compiled from the reports supported these statements by revealing the following facts:³

1/4 of the cities had business streets which were wider than the main thoroughfares.

3/8 of the cities possessed business streets and main thoroughfares of equal widths.

3/8 of the cities had business streets which were narrower than the main thoroughfares.

These figures indicate the reason for much traffic congestion. Most of the traffic travels through the business streets and these are utterly unfitted for such large numbers.

An amazing result of this survey was that only one-third of the cities questioned had spent money on street widenings. Some of the others signified their intention of doing so later. Equally amazing was the revelation that only one-third of these cities had made a study of the traffic conditions while only one-fifth had any definite plans for future action.⁴

2. Macauley, City Planning and Automobile Traffic Problems, p. 13

3. Ibid, p. 6

4. Ibid, p. 13

The remedies suggested by the city engineers in these cities are interesting. They advocate wider streets, the establishment of one-way streets, and the elimination of traffic from the business centers. They also were in favor of the establishment of municipal garages and parking areas. They recommended the appointment of city planning boards, the zoning of the city, and the limiting of the height of buildings in the business districts.⁵

Some interesting replies from Massachusetts' cities are given below:⁶

Data on Street Widening

<u>Widened because of traffic</u>			<u>Under Construction</u>		<u>Widening Proposed and Estimated cost</u>
	<u>Have Any</u>	<u>Cost</u>	<u>Are There</u>	<u>Estimated</u>	
<u>Massachusetts</u>	<u>Been?</u>		<u>Any?</u>	<u>Cost</u>	
Brockton	Yes	525,000	No		Three, \$312,500
Brookline	Yes	300,000	No		
Gardner	Yes	20,000	Yes	25,000	
Medford	Yes	100,000	No		500,000
Methuen	No		Yes		
New Bedford	Yes	1,500,000	Yes		Yes
Watertown	Yes		No		100,000
Winchester	One		No		One

The parking problem is being handled differently by the many states.

Some novel parking schemes have been tried. In Seattle an attempt is being made to reduce traffic by allowing the customers to park their cars on the roofs of the department stores.⁷

"New York City has a twenty-four-story garage, centrally located, where cars are received and delivered at the ground level. The customer shuts off his motor when he surrenders it, and it is not started again until the customer starts it. An electric parker places and delivers it, and delivery at the

5. Ibid.

6. Ibid, p. 31

7. Business Week, March 12, 1930, p. 16

The committee suggested by the city engineers in these cities are interesting. They advocate wider streets, the establishment of one-way streets, and the elimination of traffic from the business centers. They also were in favor of the establishment of municipal garages and parking areas. They recommended the elimination of city planning boards, the zoning of the city, and the limiting of the height of buildings in the business districts. Some interesting voices from Massachusetts' cities are given below:

Data on Street Widening				Widened because of traffic			
City		Have Any		Have Any		Under Construction and Estimated Cost	
		Road?		Road?			
		Yes		Yes		Cost	
Boston		Yes		Yes		\$25,000	
Brookline		Yes		Yes		\$50,000	
Gardner		Yes		Yes		\$25,000	
Haverford		Yes		Yes		\$100,000	
Methuen		No		Yes		\$25,000	
New Bedford		Yes		Yes		\$1,500,000	
Pittsford		Yes		Yes		\$100,000	
Winchester		Yes		Yes		\$25,000	

The parking problem is being handled differently by the

many cities.

Some novel parking schemes have been tried. In Boston an

attempt is being made to reduce traffic by allowing the customers

to park their cars on the roofs of the department stores.

"New York City has a twenty-four-story garage, centrally

located, where cars are received and delivered at the ground

level. The customer alights off his motor when he enters the

and it is not started again until the customer alights at the

electric, where it is placed and delivered at the

street level is guaranteed in three minutes, from any part of the garage."⁸

We have already mentioned in a previous chapter that department stores have established free garages for their patrons and some have a delivery service which relieves the customer of his car, parks it, and re-delivers it.

To speed up traffic in New York City an aerial highway is being built. "Construction is proceeding rapidly on the elevated motor road which will border Manhattan's western shore from West to 72nd Streets. The highway will have eight traffic lines, with no side entrances or exists, and will be especially convenient for traffic to the financial district."⁹

The horse has almost entirely disappeared from city traffic. He is seen only in those sections of the city where heavy trucking concerns use him because the frequent stops which the business necessitates make the horse cheaper than the auto truck. But even here the replacement of horses by auto trucks is not uncommon.

In 1910 manufacturers were making two million horse-drawn vehicles yearly.¹⁰ This would indicate a prosperous business. In 1930 checkers for the Boston Traffic Commission in Governor Square during a ten-hour count saw only 58 horse-drawn vehicles out of a total number of 36,000 vehicles which passed this spot. This averages less than one to every 620.¹¹

While on this subject of horses, it is interesting to con-

8. Bent, Machine Made Man, p.177

9. Business Week, March 26, 1930, p.8

10. Simonds - Henry Ford, Motor Genius, p.115

11. Boston Sunday Post, April 13, 1930, p.2

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8. Best, Machine Made Man, p. 177.
9. Business Week, March 30, 1930, p. 8.
10. Simonds - Henry Ford, Motor Control, p. 119.
11. Boston Sunday Post, April 13, 1930, p. 8.

sider a statement of the President of the American Road Builders' Association. He says, "The loss of time because of traffic congestion in some instances in large cities is making transportation by horse-drawn trucks more economical than by motor-driven vehicles." He also thinks the solution of the traffic problem will be found in the establishment of regional planning committees as has already been done in Chicago.¹²

The most serious problem resulting from increased traffic is that of automobile accidents. In 1928 there were 27,097 deaths in automobile accidents. Of this total 2,165 were grade-crossing fatalities while the remaining 24,932 were street and road accidents.¹³ No definite figures are available for those injured by automobiles when such injury does not result in death, but it is estimated that the yearly number is close to 600,000.¹⁴

The American World War casualties were nothing when compared to our automobile casualties.

One cause of accidents that can be avoided is the grade-crossing. In the United States there were in 1928 unprotected grade-crossings to the number of 207,231. Over one-half of these were in the South.¹⁵

The economic loss from deaths and accidents, due to automobiles, can never be calculated. Insurance companies have said that a human life was worth from \$4,000 to \$5,000 but such a figure is ridiculous. The value of a human life is beyond price. The price-fixing of such a sacred thing is only a yard-stick by

12. Boston Sunday Globe, April 13, 1930, pp.1 and 32

13. N.A.C.C. - Facts and Figures, 1929, p.84

14. Stark - Model Municipal Traffic Ordinance, p.1

15. N.A.C.C. - Facts and Figures, 1929, p.84

which insurance companies can settle their claims and continue to make profits. The economic value of a life is incalculable. One life may be of tremendous importance economically to the community, whereas, another life may not be of the same value.

Loss of wages and time caused by an automobile accident is never recoverable and is a serious economic problem to both the employer of the injured and also to the injured man. Other losses of employee efficiency can be traced to the fatigue, headaches, and illness caused by the noise made by automobiles and also by the inhalation of poisonous gases discharged by the automobile.

It is a significant fact that while accidents from other causes have decreased, accidents due to the automobile have increased out of proportion to the increase in the registration.¹⁶

One of the most serious effects of traffic delays is the congestion tax which we pay indirectly because of the absence of well planned streets. This is not realized by the citizen of the city but it is a recognized economic fact. Our time is valuable and traffic delays, which we would avoid if such an avoidance could be purchased, cause tremendous personal loss.

More serious than the personal loss is the business loss. Traffic delays cause business firms to realize only a part of their investment in trucks and wages. A truck which is delayed at every intersection does only a small part of the business that it is

16. Bent, Machine Made Man, p. 176

17. *World's Work*, December 1923, p. 125

18. Bent, *Machine Made Man*, p. 176

19. *Nation's Service Files*, April 15, 1930, p. 1

capable of doing. The driver is only rendering part of the service of which is is capable and these losses are eventually passed on to the consumer in prices which could be made much lower by well-planned cities.

Attempts have been made to estimate congestion losses, but such figures are far from accurate. They do, however, point out the importance of reducing these losses by speeding up traffic. Some interesting computations of our congestion tax are given here for what they are worth.

"Traffic congestion in New York costs \$1,000,000 a day." The Regional Planning Committee of New York City has made the estimate.¹⁷

"New York loses half a billion annually from congestion, Chicago three hundred million, Boston twenty-five million."¹⁸

"The study has revealed that the cost of traffic congestion in Boston is estimated to be \$81,000 per day as compared to a cost of \$600,000 per day in Chicago, prior to the inauguration of the regional improvement program. The cost of this evil in New York is given as \$1,000,000 a day."¹⁹

The seriousness of the traffic situation has received national attention. Two conventions with the titles of "National Conferences on Street and Highway Safety" have been held in Washington, one in 1924 and the other in 1926.

The first Conference suggested a study of standard rules and this was authorized. At the Second Conference in 1926,

17. World's Work, December 1923, p. 125

18. Bent, Machine Made Man, p. 176

19. Boston Sunday Globe, April 13, 1930, p. 1

over 1,000 delegates were present including official delegates appointed from every state by the Governors. This Second Conference amended and ratified the suggestions of the First Conference.

The recommendations consisted of Uniform Laws which the states are urged to adopt. The Laws are published in four pamphlets as follows:²⁰

- I. A Uniform Motor Vehicle Registration Act
- II. A Uniform Motor Vehicle Anti-Theft Act
- III. A Uniform Motor Vehicle Operators' and
Chauffeurs' License Act
- IV. A Uniform Act Regulating the Operation
of Vehicles on Highways

The adoption of these Laws will come eventually. Traffic casualties will force an educated public to cause them to be passed.

The American Engineering Council, which participated in the two Conferences has made a study of "Street Traffic Signs, Signals, and Markings".²¹ This study attempts to standardize these items so that confusion will be eliminated.

That traffic problems in Massachusetts are certain to increase is evident from the increase in registration of automobiles in this State in 1929 of 14.6 per cent. over 1928.²²

Boston, as one of the oldest cities in the country, has had very difficult traffic troubles. The crooked streets of this City have been the subject of many jokes.

That city planning was in existence in the early history of Boston is a known fact. In 1628-29 the Massachusetts Com-

20. Published by the National Conference on Street and Highway Safety, Department of Commerce, Washington, D.C.

21. Published by the American Engineering Council, Washington, D.C.

22. Automotive Trade Journal and Motor Age, January 1930, p. 33

pany in England engaged Thomas Graves, an engineer to "lay out" the streets of what is now Charlestown, a part of Boston.²³

South Boston streets were planned in advance, at the time of its annexation, upon authority of the Legislature in 1804.²⁴

Boston has spent large sums of money to better the street conditions and the following paragraph is instructive.²⁵

"Mr. Harland Bartholomew of St. Louis is authority for the statement that Boston previous to 1900 had spent more than \$40,000,000 in straightening and widening streets in Boston. The Boston Chamber of Commerce in a recent bulletin declared that in the ten-year period from 1920 to 1929 inclusive, a total amount of \$45,283,845 had been authorized by the State or City for expenditure on major highway development in and to be paid for by the City of Boston. Arithmetically this means that since its incorporation as a City in 1822, Boston has spent more than a hundred million dollars on its street system without any definite program in mind. Much of the work has been admirably done. All of it might have been accomplished to greater purpose if it had been accompanied by a carefully considered comprehensive plan based upon present conditions and future requirements."

Boston realized that city planning was a wise, economical necessity. Before it spent more money it decided to take an inventory of its position.

A traffic survey was ordered and it was prepared under the direction of the Mayor's Street Traffic Advisory Board by the

23. Planning for Boston 1630-1930, p. 6

24. Ibid, p. 7

25. Ibid, p. 11

Albert Russell Erskine Bureau of Harvard University. The director was Professor Miller McClintock.

This Board counted the traffic at the principal intersections and also noted the types of cars travelling over particular streets. Its report is a very voluminous work and Boston should be able to plan on the basis of the information it furnishes. A short summary of the important findings are appropriate for this thesis.

The mileage and the width of downtown Boston streets are interesting facts.

They are reprinted here.

Mileage Of Public Streets In Downtown Boston²⁶
(Exclusive of Intersections)

<u>Width of Roadway</u>	<u>Length in Miles</u>	<u>Per cent. of Length</u>
0-20 ft.	10.87	16.7
21-30	15.20	23.5
31-40	19.78	30.6
41-50	8.84	13.7
51 ft. and over	10.02	15.5
Total	64.71	100.0

The concentration of business in one small area is sure to bring tremendous traffic problems. The Committee studied the number of people working in Boston who use the streets at approximately the same hours for arrival at and departure from their places of business. These figures may be interesting.

26. Mayor's Committee-Report on the Street Traffic Control System of the City of Boston, p. 419

Daytime Working Population of Large Retail Stores
And Office Buildings in Downtown Boston ²⁷

<u>Classification</u> <u>(by number of workers)</u>	<u>Number of Stores</u>	<u>Total Daytime</u> <u>Working Population</u>
Retail stores:		
2000-4000	2	7,060
1000- 2000	3	3,679
500 -1000	4	3,304
200 - 500	5	1,499
100 - 200	12	1,531
Total	26	17,123
Office Buildings:		
2000 -4000	7	18,354
1000 -2000	17	21,563
500 -1000	23	15,662
200 - 500	41	13,054
Total	88	68,633

These 86,000 people are employed in the larger stores and offices. The number would perhaps be tripled if we could get the figures for the smaller stores also.

That these employees form a small part of the downtown traffic is apparent from the estimate of the Board which concluded that approximately 825,000 persons enter the district daily.

From this figure, 825,000, the Board estimated the personal monetary loss suffered from traffic congestion. These figures have been widely quoted and they are worth repeating here. It will be noted, however, that business losses from congestion, which we mentioned in the last chapter, are not figured.

The computation is as follows: Each of the 825,000 daily visitors loses ten minutes a day, or 8,250,000 minutes. This

number of minutes reduced equals 137,500 hours or 13,138 working days of eight hours a day. Valuing each minute of delay at one cent, we get \$32,500. Multiplying this by 300 working days the total personal loss equals \$24,750,000.²⁸ The loss from accidents amounts to \$2,094,250.

The number of motor vehicle accidents analyzed as to the ages of pedestrians injured is enlightening. The period covers the first ten months of 1927.

Years	Per Cent injured ²⁹
0-4	12.0
5-7	13.9
8-14	17.2
15-35	21.8
36-55	17.8
Over 55	<u>12.3</u>
Total	100.

The greatest number of injuries occurred to those between the ages of 15-35. This upsets a rather fixed idea that accidents occur mostly to the very young and the very old.

The cumulative total of those under 15 amounts to 43.1 while the total of those over 14 amounts to 51.9. No matter what combination is tried the result proves conclusively that those who are expected to be careful are on the contrary the most careless.

The most important information in the book, according to what Mr. Stevens (Professor Mc Clintock's Secretary) told

28. Ibid, pp. 131 ff.

29. Ibid

the writer on a visit to the Erskine Bureau, is in the following statistics:

30

Vehicular Speed And Obstructions On Selected Streets
(Downtown Boston)

Total Time of All Obstructions	40.3%
Overall Running Time Minus Obstructions	59.7%

Total Time	100.0%
------------	--------

Length Of Time Of Obstructions

Due to Cross Traffic	Due to Other
At Intersections	Obstructions
35.2%	5.1%

Of the loss of time due to obstructions, 40.3 per cent. of the total time, the greatest part of this delay, 87.3 per cent., was due to the time lost at intersections.

With all this information to guide them, plus a detailed study of every important intersection, The Boston City Planning Board should be able to plan for the future. This Planning Board is under the direction of Mr. Robert Whitten, City Planning Consultant, of New York, who has the assistance of Mr. Arthur ³¹ Comey of Cambridge. The Planning Board is a source of encouragement in its determined attitude to consider the future and not to make any improvements which will ignore the expected growth of the city for the next twenty-five years at least.

Another step in the right direction has been taken by Boston in the installation of the only automatic traffic signals of their type in the world. These are to be at all important intersections and in use by July, 1930

30. Ibid, p. 417.

31. Planning for Boston 1630-1930, pp. 11-12.

at the latest. They will do away with the present inefficient traffic control which does not permit the officers to work to-gether. At the present time one officer is waving traffic to move north while the officer at the next intersection is moving his traffic west and the twollines meet in a hopeless muddle.

The new lights will be controlled from a board at City Hall. This board is 14 feet by 6 feet and may be operated independently by any one of three controls. If a short circuit should occur in the master control handling the lights, the operation of the lights would automatically be thrown to the second control and a warning given that the first was out of order.

It is planned to keep the traffic in Washington Street moving from Boylston Street to Haymarket Square without a stop. Traffic on Tremont Street which is south bound will also move in the opposite direction without stopping.³²

If the lights are successful then chaos will be ended and orderly traffic movement will be the new order.

32. Boston Sunday Post, April 13, 1930, p. 13

CHAPTER XIII

EFFECT OF THE AUTOMOBILE ON AMERICAN LABOR

The Department of Labor of the United States has published its findings of 1923 in the automobile industry. Some of its figures are especially interesting.

Based on the 1925 Census of Manufactures, it was found that 91 per cent. of the wage earners in the automobile industry¹ were employed in eight States as follows:

Number of Wage Earners (Male and Female)

Illinois	3,421
Indiana	10,600
Michigan	95,624
New Jersey	5,680
New York	10,368
Ohio	15,036
Pennsylvania	8,222
Wisconsin	5,010
Total	<u>153,962</u>

Later figures indicate that there are 402,138 employed in the manufacture of motor vehicles. These persons are employed directly in the manufacture of the machines and the number does not include those engaged in the making of parts, accessories, bodies or tires. These men earned wages which² amounted in 1923 to \$712,567,699.

The Bureau of Labor investigated 94 establishments in the 8 States already mentioned. Some interesting statistics³ which they published follow: 3

1. Bureau of Labor Statistics, Dec. 1929, p.1
2. N.A.C.C. - Facts and Figures, 1929, p. 14
3. Bureau of Labor Statistics, p.5

Average full time hours a week	49.4
Average earnings an hour	\$.75
Average full time weekly earnings	37.05

These figures for 1928, published in 1929, indicate that steady employment was given to the workers, that the hourly rate was high, and that the weekly wage was the highest of any other manufacturing industry considering the large number employed.

Out of the 94 establishments examined, it was found⁴ that 42 of them had a bonus system of production.

The high wages paid in the automobile industry can be traced to Henry Ford whose minimum wages, back in the early days, caused all other automobile manufacturers to follow his lead because all the best mechanics were offering their services to Ford.

That Ford has confidence in the ability of the automobile industry to continue paying high wages is evident from a report which was recently published. It announced that on December 2, 1909, Ford raised wages \$20,000,000 a year and established a minimum wage of \$7 a day.⁵ This raise was in keeping with a promise made to President Hoover. The latter had called a meeting of prominent business men from every section of the country, after the stock-market "crash" in November, 1929, and had asked them not to reduce wages. Ford answered by raising

4. Ibid. p. 6

5. Nation's Business, Jan. 1930, p.16

wages in accord with his ideas that the public must have money to buy cars, and that the more money in circulation the more cars will be bought.

Ford reduced the prices of his cars at the same time that he increased wages, but as we have previously noted he passed the burden of carrying this decrease along to his dealers with a consequent loss to these agents.

The number of workers employed in the automobile industry directly and indirectly amounted to 4,341,138 in 1928 as the following tables indicate. The figures of 1929 will prove interesting, when they are published, in order that we may determine whether the maximum number has been reached and whether or not the effect of machine replacement has been felt.

4,341,000 Employed in Automobile Industry in the
United States⁶

Employed Directly

Motor vehicle factory workers	402,138
Parts and accessory factory workers	200,000
Tire factory workers	96,000
Motor vehicle dealers and salesmen	365,000
Supplies, accessories, tires and parts, dealers and salesmen	160,000
Garage employees	128,000
Repair shop employees	300,000
Professional chauffeurs	635,000
Professional truck drivers	1,500,000
Gasoline refinery and oil workers	150,000
Automobile financing and insurance	20,000
Total directly employed	<u>3,956,138</u>

6. N.A.C.C. - Facts and Figures, 1929, p. 14

Employed Indirectly

Iron and steel workers	65,000
Copper, lead, tin, nickel and aluminum workers	16,000
R.R. workers	96,000
Plate glass workers	15,000
Tannery and leather workers	9,000
Lumber and woodworkers	17,000
Upholstery cloth, top and side, curtain material workers	18,000
Asbestos brakelining workers	2,500
Lacquer and enamel workers	4,500
Coal miners	4,000
Electric power workers	4,000
Highway officials, contractors, engineers, etc.	100,000
Road material factory workers	12,000
Machine tool workers	22,000
Total indirectly employed	<u>385,000</u>
Grand Total	4,341,138

This huge number of over four million affects directly the prosperity of countless millions, and there is no question but that our prosperity depends upon the continuance of this industry to function. It is difficult to think of any other new industry that even approximates the effect of the motor-car industry. The radio and the airplane industries have grown tremendously but the price of the radio and its upkeep are not capable of producing the expenditures that the automobile necessitates. The airplane industry's growth is limited due to the lack of confidence in the airplane because of the numberless accidents which occur even with the best of pilots.

That the machine is supplanting the workers is an evident fact as we have illustrated by our charts from the Report on Recent Economic Changes. Some figures worked out in index numbers by Evans⁷ Clark for all industries further prove this new trend.

<u>Year</u>	<u>Factory Employees</u>	<u>Production</u>
1914	100	100
1919	129	147
1924	116	158
1927	115	170

The trend is downward in employees, upward in machinery, and upward in production and productivity.

The United States Department of Labor reports that between April, 1923, and April, 1928, more than 1,250,000 factory workers were permanently "laid off." In the same period the number of railroad employees decreased by 150,000.⁸ The latter figure is due undoubtedly in part to the decrease in passengers because of the automobile, which machine, however, has caused a re-distribution of labor resulting in a net increase of employees.

The automobile has overcome partly one handicap that labor as a class struggled against, that was the immobility of labor. In towns which concentrated on one industry, labor

7. Chase, Men and Machines, p.210

8. Ibid

could not be independent. The factory owner dictated terms and, unless these terms were too oppressive, the laborer accepted them grudgingly. Now labor does not accept such terms. The automobile has broken down distance between towns and cities and has increased the independence of the laborer.

The mass-production methods of the automobile industry, as in all other industries, have deadened the initiative of the workers. The machinery has been so perfected that the following statement has been made about Ford machinery:

"In fact it is very difficult for even an unskilled man to spoil a piece of work unless the machine itself is out of order, and constant inspection safeguards that."⁹

The effect on labor of the machine age has been the subject of much profound study.

Dr. C. S. Myers has divided machine laborers into three classes. His psychological studies have revealed the following reactions on these three types.

"There is a recognized type which takes no interest in his daily work but is apt to satisfy his longings by recourse to pleasant imagination of day-dreaming. For him no repetitive task, however monotonous, is felt as such. So long as he is not asked to alter his methods or attend to new details, he remains happy.

"A second type resents his work, but strikes a psychic balance with sport or other outside activities.

"A third type is in continual revolt, and if kept at repetitive work too long, is likely to fly off the handle. He is invariably of higher intelligence than his mates in the other groups".¹⁰

From the foregoing it is evident that nothing can be done for the first class. It would be a waste of time to bother with his case. But in the other two classes we have a mal-adjustment which is neither economically nor socially desirable.

That such a condition is not economically desirable is proved by a study of the Psychological Institute of Paris which conducted an experiment of giving intelligent girls monotonous cross-stitching work to do. They learned easily and their early output was enormous but they gradually fell behind average girls in the output.¹¹

The conclusion is evident. The monotony of the work appalled, and they became inefficient because of lack of interest.

That serious and harmful effects may result from putting intelligent men at work on monotonous jobs has been reported in a psychological study by R. L. Cruden. Many men confessed to him that the work affected them in such a way that they could not settle down at night to read but that they had to resort

10. Chase, Men and Machine, p. 161

11. Ibid, pp. 161 ff

to some emotionally violent form of escape.¹² These were men who would probably be classified in Dr. Myers' third group.

That this monotony has become a problem is evident from the time and motion studies that have been so popular of recent years. These studies have been made in some instances to increase profits, but they have been made in other industries to eliminate the accidents due to fatigue in operating the monotonous machines.

By these studies, the conclusion has been reached that frequent intervals of rest not only eliminate fatigue and accidents, but they also increase the output of the workers.

The Industrial Fatigue Research Board of England has found that in monotonous types of work that Tuesday morning between 8:15 and 10:15 is the time when fatigue is at a minimum.¹³ The best work is done on Tuesdays, Wednesdays, and Thursdays, and then comes a gradual slowing down which is not increased until the following Tuesday morning.

This is explainable by the fact that the week-end is not always a period of rest, but many people use it in such a way that they tire themselves more than during the working-week. By Tuesday they are rested and are able to produce efficiently.

Monotonous work may be necessary for mass-production but the worker's pride in his job has disappeared. He is making the best adjustment to the machine age period in which he lives. By this adjustment he is able to get higher wages (when he can obtain the work) with which to enjoy some of the machine-age's

12. Ibid

13. Ibid

time and labor saving luxuries.

The absence of strikes in the automobile industry is a noteworthy improvement over the condition in older industries.

The industry is the most important one, economically, of the United States. The large number employed directly and indirectly and the tremendous output of 34 per cent of the world's registration of cars attest to its importance. The large amount of capital (\$2,500,000,000) invested and the widespread ownership by all classes of the population are other important items. The most important contribution of the growth of the industry has been the prosperity which it has generated. Billions have been paid to those interested in the business in any way and other hundreds of millions have gone into State treasuries for various taxes.

Henry Ford has been unquestionably the outstanding figure in the automobile business of the world. His introduction of a low-priced car changed the character of the industry entirely. From the use of the automobile as a plaything by the wealthy it became a means of general necessity. It was the "killer" of poverty in the automobile industry, and his success was a vital factor in the adoption of mass-production by every other industry. His

CHAPTER XIV

SUMMARY OF THIS STUDY

In the early development of the automobile, France was the pioneer but in the year 1893 with the many inventions in the United States the leadership passed to this country where it is still held.

The industry is the most important one, economically, of the United States. The large number employed directly and indirectly and the tremendous output of 84 per cent, of the world's registration of cars attest to its importance. The large amount of capital (\$2,000,000,000) invested and the widespread ownership by all classes of the population are other important items. The most important contribution of the growth of the industry has been the prosperity which it has engendered. Billions have been paid to those interested in the business in any way and other hundreds of millions have gone into State treasuries for various taxes.

Henry Ford has been unquestionably the outstanding figure in the automobile business of the world. His insistence on a low-priced car changed the character of the industry entirely. From the use of the automobile as a plaything he has developed it until it has become an economic necessity. He was the "father" of mass-production in the automobile industry, and his success was a vital factor in the adoption of mass-production by many other industries. His

radical economic theories have been eagerly studied and adopted by economists. His novel theory, suggested by Couzens, that "high wages are cheap wages" is generally accepted as true. Labor owes a certain debt to Ford for his courage in carrying out his theories.

His courage has been manifested at other times. The defiance of the Selden patent was one exhibition. The change from Model T to Model A was another experiment which required courage.

His abhorrence of waste has caused his company to go into the business of producing and hauling many of the supplies necessary to the manufacture of his products. His war work for the United States was admirable.

The social life of Ford has been filled with many blunders but the consideration of these does not belong in an economic work.

The building of good roads was a necessary incentive for the growth of automobile sales. The National Government by its aid in the Highway Acts of 1916 and 1921 has contributed half of the expenditure in the States for all roads, except city streets, and by this aid it has stimulated the growth of good roads.

The programs for 1930 call for an expenditure of \$1,650,000,000. This expenditure will furnish the country with additional roads, it will increase the health of the population, and it will be of economic benefit by its increase of valuations and consequent increased income from

taxes. Good roads have proved to be an investment and not an expense.

The automobile growth has affected many other industries. Some of these on which it has exerted a tremendous influence are as follows: The oil industry has been revolutionized and this industry as a result of economic conditions and the greed for profits from automobile-fuel sales is now witness to a race for economic advantage which will result from control of the oil supplies. Conservation has been found to be necessary in the United States.

The rubber industry has also been affected by the automobile. The demand for rubber has resulted in ~~another race~~ for economic advantage. Restrictions have been tried and repealed. The United States has realized its dependence on a foreign source of supply and is making every effort to promote American-controlled production.

Plate glass, leather, hardwoods, aluminum, copper, tin, iron, and steel are the major industries which reflect the growth of the motor-car industry.

Minor industries which have felt the change have been the zinc industry, the nickel, softwood, upholstery cloth, paint and lacquer, and hair and padding industries.

The raising of horses and the industries dependent upon the horse have been unfortunate victims of this growth.

Agriculture had adapted the motor-car, the tractor, and the truck to its needs. Farm operations have been made easier

and farm marketing has been completely changed. The migration of farm population from the country to the city has been checked. The social life of the farmer has also been made more pleasant. That some of the present farm problems are due to the transition from horses to motors with the consequent new planning of crops, is the contention of some people.

Marketing methods have been completely changed with the advent of the automobile. Motor-car manufacturers have many troublesome style policies with which they must contend. Their marketing organizations must be alert in a strongly competitive business. Advertising has grown with auto marketing. Both industries have been helpful to each other. The Automobile Shows have been of much use in advertising. The introduction of unrelated products to automobile salesrooms is a new proposition as is the introduction of a cheap-priced car which may be sold through mail-order houses.

The marketing departments of other industries have re-organized their methods because of the automobiles. Mail-order houses, department stores, wholesalers, chain-stores, and other business firms have adopted the automobile and truck to insure better marketing service.

The greatest effect of the automobile on real estate has been the development of the suburbs. The style of architecture has recognized the need of private garages and the building of structures to house automobile companies and their output has increased tremendously.

The center of the motor-car industry is in Detroit. This City furnished the materials, the labor, and the capital for the beginnings of the industry, and the reward has been a growth of material prosperity in Detroit. Many benefits have been conferred on Detroit but it is confronted by the danger of losing its diversification by concentration on one industry. In a time of distress the whole city would suffer. The City puts too much confidence in this one industry.

Increases in bank savings have been a result of the great growth of our leading American industry. Much money has been withheld from the banks to buy automobiles. The net effect is not known. Banks have followed the automobile-developed suburbs. The banks were hostile at first to the new industry, but that they have a favorable attitude now is apparent from the entry of these banks into the automobile finance field.

The railroads have lost a great number of passengers to the automobiles, but they have gained the enormous amount of 3,500,750 carloads of freight. The net gain has been partly responsible for the present strong condition of many railroads. The electric railways have not lost passengers, but have on the contrary increased the number of riders.

Both railways and railroads have adapted the bus to their services. The railroads have also employed motor trucks to speed up their deliveries. Every business concern, almost without exception, has employed the automobile truck in place

of the horse-drawn trucks of former days.

The growth of the automobile has brought a serious traffic problem which not only results in yearly accidents to hundreds of thousands, but also causes serious personal and business congestion losses.

Most wide-awake cities have studied their traffic problems and have appointed planning committees. Street widenings have caused the expenditure of billions of dollars and other billions have been lost through congestion taxes.

National recognition has been taken of the problem and National Safety Committees have compiled standard rules and regulations and it is hoped that these Uniform Laws will result in better traffic control.

Boston is solving its problem in a commendable manner. It studied its condition, appointed an excellent Planning Board, and has installed a uniform street lighting system which it is expected will prove successful.

The effect of the automobile's growth on American Labor has been interesting. A new industry was introduced which employed eventually over 4,000,000 men. The wages paid were higher than in other industries because of Ford's new theory of wages.

The mass-production feature has been responsible for work which in many jobs involves monotonous repetition. The worker has sacrificed skill and beauty of production to the necessary simplified, standardized needs of mass-production.

The worker is satisfied and there have been few strikes, if any, in the industry. The workers have been displaced in large numbers by the more efficient machines and this has added to the seriousness of the technological unemployment problem.

Machine tools worth \$1,000,000,000. This does not include any investment in parts, accessories, tools or labor.

That the automobile will continue to exert an important influence on American life is certain. One of the reasons that Americans have bought so many machines is the increase in the number of automobiles. This amount was estimated to be \$1,000,000,000 in 1930. The national yearly income in 1930 as here referred previously is \$90,000,000,000.

While it is true that the major part of this wealth and income belongs to a few, it is also true that the standard of living in the United States is much higher than in other countries.

It is expected that the American people will continue to buy a small part of their total wealth in automobiles. That the automobile will be a factor in the future of the American people is certain. It is also true that the automobile is a factor in the future of the American people. It is also true that the automobile is a factor in the future of the American people.

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CHAPTER XV

FUTURE OF THE INDUSTRY - CONCLUSIONS

At the present time there is invested in the manufacture of motor vehicles alone nearly \$2,000,000,000. This does not include any investment in parts, accessories, bodies or tires.

That the automobile will continue to exert an important influence on American life is assured. One of the reasons that Americans have bought so many machines is the enormous wealth which the country enjoys. This amount was estimated to be \$481,000,000,000 in 1929.¹ Our national yearly income to which we have referred previously is \$90,000,000,000.

While it is true that the major part of this wealth and income belong to a few, it is also true that the standard of living in the United States is much higher than in other countries.

It is expected that the American people will continue to invest a small part of this total wealth in automobiles. That the investment will be a wise one is indicated by index statistics which have arrived at the fact that while our cost-of-living dollar is worth only \$.62 our automobile dollar is worth \$1.13 on a 1914 base.²

The cost of operating a car which will run 11,000 miles annually is estimated at 6.43 cents for each mile.³

The output for 1930 is the subject of much debate. In 1929 the stock market turnover, which resulted in tremendous losses (paper losses to many and cash losses to others) is

1. Denny, America Conquers Britain, p. 41

2. N.A.C.C. Facts and Figures, p.4

3. Ibid, p. 74

responsible for much of the uncertainty.

The total number of cars registered in Massachusetts in January and February 1930 was smaller by 17.3 per cent than that of the corresponding two month of 1929.⁴

The total output of the country in January, 1930 was 273,089 as compared with a production of 401,037 in January, 1929.⁵

An authority, "Automotive Industries", says that the output in 1930 will be 4,945,000 units as against 5,500,000 in 1929.⁶ Julius Barnes, chairman of President Hoover's business survey conference estimates the output will be 4,600,000.⁷

While all of these figures predict a decrease in the number produced, in none of them is an explanation of the loss given. It has been explained, however, by Colonel Leonard P. Ayres, the expert statistician and authority on automobile production, who asserts that in 1929 the industry overproduced. He urges dealers to sell their old stock of cars quickly.⁸

If it is true that there was overproduction in 1929 then we must be near to the saturation point.

Colonel Ayres in 1925 wrote that the saturation point would be 27,500,000 motor vehicles.⁹ Others have estimated that the point would not be reached until we had 50,000,000 cars but this appears at the present writing to be improbable.

Some of the reasons that make this latter figure seem unlikely are these. The street conditions would not permit

4. Associated Press, Boston Post, March 31, 1930, p. 5

5. Department of Commerce, Feb. 22, 1930 release for newspapers.

6. Nations's Business, Dec. 1929, p. 18

7. Boston Post, March 24, 1930, p. 21

8. Automotive Trade Journal and Motor Age, Jan. 1, 1930, pp. 24 ff

9. Journal of Society of Automotive Engineers, Feb. 1925, p. 195

such a number. Traffic is hopelessly handicapped now without adding to the difficulty. Lack of highway facilities is said to have retarded sales in New York, Chicago, Philadelphia and Boston.¹⁰ Automobiles are being built better today than formerly. There is no reason why they should be replaced quickly by others.

This large figure will never be reached until some solution of the used-car problem is made. In the past the dealers have allowed a certain minimum amount on used-cars (regardless of their worth) traded in when a purchase of a new car was being made. Then the dealer promptly turned the old car over to the junk dealer taking a loss in order to sell the new car. The junk dealer would give the automobile dealer a small amount for the car and take it away. The same car might be purchased from the junk dealer by a prospective customer of a new car, who in turn would receive an allowance from the automobile dealer who would then sell the car again to the junk dealer and thus this practice continued.

The automobile industry is now establishing its own junk yards and the traded-in cars are really destroyed. The National Automobile Chamber of Commerce says that auto makers will spend about \$15,000,000 this year to scrap some 440,000 cars to make driving safer and incidentally to help sell new cars.¹¹

In Omaha they have a "Cooperative Salvage Yard of the Omaha Auto Trade Association." This junk yard is making money and paying over seven per cent. on its stock and what is more important it is

10. Boston Sunday Globe, April 13, 1930, p.32

11. Nation's Business, April 1930, p.18

also disposing of the old cars.¹²

Ford Motor Company is experimenting with the idea in the Detroit district. The Company allows \$20 for each junker, less a small charge for transporting it. The good parts are salvaged and the rest are melted in the blast furnaces.¹³

From all this foregoing information it is safe to conclude that the number of automobiles that the United States can afford at the present time is an annual output of between four and five million. Unless traffic conditions improve, we can also conclude that we are very near to the saturation point.

The Ford factories should increase their proportion of the total business as many stock-market losers will have to be content with cheaper cars than they have had in the past.

General Motors has resorted to ten-day inventory reports from its 20,000 dealers in order to correlate production and distribution.¹⁴

The future growth of the industry may have to be found in the sales to foreign countries. About 83 per cent. of the world's registration is now in America leaving the rest of the world with only 17 per cent.

"During 1928 half a billion dollars' worth were sold and distributed abroad." ¹⁵

General Motors has 24 overseas plants and 6000 foreign distributing centers. By purchasing the Opel Company in Germany the

12. Nation's Business, Sept. 1929, p. 138

13. Business Week, March 19, 1930, p. 13

14. Boston Globe, March 30, 1930, p. 40

15. Bent, Machine Made Man, p. 176

General Motors became the largest automobile manufacturer in Central Europe. The American Company is also negotiating for the Citroen Company of France, which is responsible for 40 per cent. of France's total production.

General Motors is in business in 104 foreign countries and Ford is just starting in many of them.¹⁶

Ford in good faith issued the capital stock of his European companies to the British and the Belgians in order to avoid any feeling of national ill-will. This stock was immediately bought by New York bankers who realized its worth and the control is back in American hands.

Our leading export market for trucks is Australia to which country we sent 69,733 in 1928. Our leading market for the export of passenger cars is Argentina to which we sent 58,919 in the same year.¹⁷

France has recently served notice of her intention of competing with us in this field by passing a prohibitory tariff on American automobiles.

France while not approaching our output has the next highest number of motor vehicle manufacturers. We have 152, France has 101, United Kingdom has 98 and Germany has 73.¹⁸

Our War Department because of their use in the late war is very much interested in motor-cars, tractors, and trucks. The strategy of the army has been altered by their introduction.

16. Denny, America Conquers Britain, p.139

17. N.A.C.C.-Facts and Figures, 1929, p. 24

18. Ibid, p.18

Ammunition and food are brought much closer to the front. Heavy guns may be mounted on motors. The wounded may be moved more quickly. Troops may be quickly moved to an important point which is threatened. The transportation work back of the lines is carried on by motor-cars and the number of men needed is reduced.¹⁹

One of the greatest customers in the future should be the War Department of the United States.

In conclusion we find that there was overproduction in 1929. In 1930 there will be a loss in output unless foreign sales can be increased greatly. Ford should do in 1930 a larger proportion of the annual motor-car business because low-priced cars will be popular in 1930 due to stock-market reverses.

The number of American roads will increase in the future and their construction will be better than in the past.

The same industries which contribute the major supplies to the automobile will continue to be affected by the automobile growth. The race for oil and rubber may eventually lead America into difficulties with England.

Agriculture will never relinquish the advantages it has gained from the automobile, truck, and tractor. Continued use is certain and the acreage previously devoted to horse-feed will be planted with other crops.

Marketing methods will continue to use the motor truck to advantage. Every industry must watch to see if any effect is made on their businesses by the automobile. The motor-car industry must watch style trends. The various companies should also carefully follow competitor's experiments in marketing unrelated products.

Suburbs will continue to grow and the more distant ones will eventually be settled. Garages and filling stations will increase if the 1930 output is proved to be only a temporary condition.

Detroit has a real problem to solve. Dangerous concentration should give way to diversification.

The banks may be expected to continue the race for automobile finance business.

Railroads cannot continue to lose many more passengers. The automobile freight will remain at least at the 1928 figure, even if production does decrease in 1930. Electric street railway passengers are increasing. Buses and trucks will continue to be used by railroads in larger numbers.

Traffic regulations must be bettered in the future. City Planning and Regional Planning are becoming economically desirable. Uniform Laws will help the problem. Congestion taxes will be reduced by better planning.

American labor should share for years to come in automobile prosperity. There will be a gradual replacement of men by machines until a minimum requirement is reached. High wages should prevail but the large number of unemployed may break down these high wages by the application of the law of supply and demand. Monotony may be eliminated by fatigue studies but not much is to be expected along these lines.

I believe this study has been valuable because it has succeeded in that which it attempted, that is to prove that American prosperity is indebted to the automobile for a large share of such

a material gain.

The automobile has affected many phases of American life and it is partly due to the vitality of the new industry that we have made such economic progress.

Eventually the automobile will be given the credit that it deserves for its contributions to the great prosperity of the United States.

BIBLIOGRAPHY

- America Conquers Britain, by Ludwell Denny
Published by Alfred A. Knopf, New York, 1930
- American Engineering Council - Report of the Committee
on Street Traffic Signs, Signals and Markings
Published by American Engineering Council, Washington,
D.C. 1929
- American Petroleum Supply and Demand
A Report to the Board of Directors of the American
Petroleum Institute by a Committee of Eleven Members
of the Board
McGraw-Hill Book Company, Inc. N. Y. 1925
- Business Without A Buyer - by William Trufant Foster
and Waddill Catchings
Houghton, Mifflin Company, Boston and New York, 1927
- City Planning and Automobile Traffic Problems, by
Alvan Macauley
Published by Packard Motor Car Company, September 5, 1925
- Economic Principles, by Homer B. Vanderblue
Published by A. W. Shaw Company, Chicago and New York, 1927
- Economic Resources and Industries of the World, by
Isaac Lippincott, Ph. D.
Published by D. Appleton and Company, New York and London,
1929
- Economics of Instalment Selling, The, - by Edwin R. A.
Seligman, LL. D.
A study in consumer's credit with special reference
to the automobile, 2 Volumes
Published by Harper and Bros., New York and London, 1927
- Encyclopaedia Britannica
Published by Encyclopaedia Britannica, Inc.
11th and 14th Editions, 1910 and 1929 respectively
London and New York
- Facts and Figures of the Automobile Industry
Published annually by the National Automobile Chamber
of Commerce, New York, N. Y.
- Financial History of the American Automobile Industry; A
By Lawrence H. Seltzer, Ph. D.
Published by Houghton, Mifflin Company
Boston and New York, 1928

- Ford Henry, Motor Genius, by William Simonds
Published by Doubleday, Doran and Company, Inc.
Garden City, N. Y., 1929
- Ford Industries, by Ford Motor Company
Published by Ford Motor Company, Detroit, Michigan, 1924
- Ford Methods and Ford Shops, by Arnold-Faurote
Published by The Engineering Magazine Company
New York, 1925
- Highways and Highway Transportation, by George R. Chatburn
Published by the Thomas Y. Crowell Company, New York, 1923
- History and Development of Advertising, by Frank Presbrey
Published by Doubleday, Doran and Company, Inc.
Garden City, N. Y., 1929
- Machine Made Man, by Silas Bent
Published by Farrar and Rinehart, Inc.
Murray Hill, N. Y., 1930
- Men and Machines, by Stuart Chase
Published by The MacMillan Company, New York 1929
- Men and Rubber, by Harvey S. Firestone
Published by Doubleday, Page & Co., Garden City, N. Y. 1926
- Men, Money and Motors, by Theodore F. McManus and
Norman Beasley
Published by Harper and Bros.
New York and London, 1929
- Moody's Industrials
Published by Moody's Investment Service, N. Y. 1929
- Motor Car and Its Story, The, by Charles R. Gibson, F.R.S.E.
Published by J. B. Lippincott Company, Philadelphia, Penn.
1927
- Planning for Boston 1630 - 1930, by Elisabeth M. Herlihy,
Secretary of the Boston City Planning Board
Reprinted from City Planning, January, 1930
- Pronouncing Gazetteer or Geographical Dictionary of the World
Edited by Angelo Heiltrin and Louis Heiltrin
Published by J. P. Lippincott, Philadelphia, Penn. 1922
- Rand, McNally World Atlas, International Edition
Published by Rand, McNally, N. Y. 1929

Recent Economic Changes in the United States
Report of the President's Committee
Published by McGraw-Hill Book Company, Inc.
New York 1929

Report on Street Traffic Control System of the City of
Boston, Mayor's Committee
Published by Erskine Bureau, Harvard College, 1928

Rubber, Its History and Development
Published by The Firestone Tire and Rubber Company
Akron, Ohio - April 1922

Story of the Automobile, by H. L. Barber
Published by A. J. Munson and Company, Chicago, Ill,
1917

Story of Detroit, by George B. Catlin
Published by the Detroit News, 1923

We Fight For Oil, by Ludwell Denny
Published by Alfred A. Knopf, New York, 1928

World on Wheels, by H. O. Duncan
Published by the author, H. O. Duncan
32 Rue des Mathurins, Paris, France

GOVERNMENT PUBLICATIONS

Bureau of Statistics:

Interstate Commerce Commission-38th Annual Report of the
Statistics of Railways for United States for year end-
ing December 31, 1924

Interstate Commerce Commission-39th Annual Report of the
Statistics of Railways for year ending December 31, 1925

Interstate Commerce Commission-42nd Annual Report of the
Statistics of Railways for the year ending December 31,
1928.

Department of Commerce, Bureau of Foreign and Domestic Commerce
Auto 1127 of 1-3-30

Compiled by Automotive Division-A.W.Childs, Acting Chief
Compilation completed December 31, 1929

Department of Commerce

Model Municipal Traffic Ordinance, The
By C.W.Stark, Secretary National Conference on Street and
Highway Safety, 1923

Department of Commerce, Uniform Vehicle Code, August 20, 1926

Uniform Motor Vehicle Registration Act

Uniform Motor Vehicle Anti-Theft Act

Uniform Motor Vehicle Operators' and Chauffeurs' License Act

Uniform Act Regulating the Operation of Vehicles on Highways

Department of Commerce-Special Pamphlet

"1928 World Production Export and Consumption of Automobiles"

Reprint from Commerce Reports of July 1,1929

Department of Commerce-Commerce Yearbook 1929,Volume 1

Department of Labor-Bureau of Labor Statistics

Volume 502, December,1929

Department of War

Statement of a Proper Military Policy for the United States

Army War College, W.C.D. 9318-1, pp. 5-17-September 1915

MAGAZINES

Annals-Published by the American Academy of Political and Social Science. Philadelphia, Penn. Published bi-monthly.

Automobile Trade Journal-Silver Anniversary Issue,

December 1,1924- Published by Chilton Company, Philadelphia,Pa.

Automotive Trade Journal and Motor Age

Published Monthly by Chilton Company, Philadelphia, Pa.

Business Week, Weekly Journal of Business, Greenwich, Conn.

Harvard Business Review, Published quarterly by A.W.Shaw Company, Chicago,Ill.

Journal of Society of Automotive Engineers, Published by this Society monthly at New York

Nation's Business

Published monthly-Merle Thorpe, Editor and Publisher

Chamber of Commerce Building, Washington,D.C.

World's Work

Monthly publication of Doubleday, Page and Company
Garden City,N.Y.

NEWSPAPERS

Barron's Weekly, published by Barron's, Boston,Mass

Boston Globe, The, published by The Globe Newspaper Company,
Boston,Mass.

Boston Post, The, published by Post Publishing Company,Boston,Mass.

Not to be taken from the library.

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